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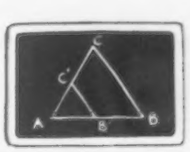
# GETTING BACK TO ARITHMETIC

THE following symposium of reader thought and comment, inspired by the article "Let's Go Back to Arithmetic," which appeared in THE IRON AGE of June 11, presents some unusual and noteworthy viewpoints.

At no previous time in our history have so many able minds been concentrating upon the intricate relationships of economic causes and effects. Were there no other reasons for our encouragement, this alone would be a guarantee of future progress.

A contribution to sound thinking is represented by the opinions of the capable and experienced industrialists and financiers which follow. The careful consideration of them will broaden our horizons and aid in the solution of our common problems.




## Common Sense and First Principles

THE banks in the larger financial centers are so pessimistic they seem to believe that all business ventures undertaken now are headed for failure. Consequently, they would never believe that the purchase of new machinery could result in profits within any reasonable time. It is a pessimism that is distinctly retarding recovery.

In the smaller cities I think the banks are willing to do just what

you are proposing; willing to go as far as they can in helping out this situation. They cannot take on too much paper that is not re-discountable at the Federal Reserve, and under the present laws loans for purchase of equipment are not re-discountable. The privilege could easily be abused.

There used to be such things as axioms in mathematics—self-evident truths—these seem to have gone by the board in recent years. But even if there are no self-evident truths, there are underlying principles which mathematicians must use in demonstrating the truths of their every-day equations. Economics is a much more complex affair than mathematics, but I doubt if economists can get away from first principles any more than can the mathematicians.

These first principles are almost axiomatic, like the axioms, in fact, of the mathematicians, and in this practical world are proving just as much so. Extravagance, waste, production by inefficient methods, forced selling, improvident buying, unnecessary expenditures whether personal or public, are the result of careless thinking, and not of any known first principles in economics.

Reduction of the cost of production—a large factor in which will be by the methods you outline—is the very first essential thing, and is in accordance with known first principles. Reduction of our extravagant ideas to a level more in accordance with the present situation is probably an important, perhaps the most important, first step. Common sense will then see what is to be done, step by step, instead of being forced into the background by illogical remedies and foolish panaceas resulting from our strenuous wishing things were otherwise than they actually are now.

Extravagance, whether personal or in production-costs, will not maintain our standards of living. It is to be feared that a material lowering of these standards may be necessary unless the common sense of mankind can soon separate the quack-remedies of false economists (however sincere they may be in these distressing times), who have lost sight of fundamental principles, from those who can continue to think straight in adverse circumstances.

**FRANCIS FARQUHAR,**
**President,**
A. B. Farquhar Co., Ltd.

## Must Build Farmer Buying Power

THE formula you refer to does not hold true in our case. In the years since the war we have spent money for new equipment far beyond anything that we ever did in the past, and today, for the most part at least, our shops are equipped to the minute with the best machinery available. At the present time we have many millions of dollars tied up in idle machinery of the very latest make simply because our customers, the farmers, are not able to buy the labor-saving equipment they need.

I am wondering why in all these studies you people make of the present situation you leave the farmer entirely out of your calculations, as that is where the potential buying need exists today. Our cities are overbuilt, but the farms of the country need improvements in sufficient volume to keep most of the industries of the country active for many years to come if they could obtain what they need and what they would buy if they had the wherewithal.

Your schedule would be workable in some cases, but it is not the complete answer.

**ALEXANDER LEGGE,**
**President,**
International Harvester Co.

## Non-Elastic Markets Restrict Price Reductions

SO long as manufacturers pass on to the public all the savings secured by improvements to plant or greater efficiency, they cannot expect bankers to loan them money even for such purposes. Bankers must look to the profits of a business to repay loans. It is doubtful whether reductions in costs of many commodities are of any benefit to any one that result in lower prices to the consumer without any additional profit to the maker. Increased production of commodities that do not possess an elastic market may well cause more damage to the manufacturers and distributers than any benefit to the consuming public. As an illustration, many people believe that the nation as a whole would have been better off if the unabsorbable surplus of 200,000,000 bushels of wheat had not been produced this year even though the crop without these

200,000,000 bushels had cost just as much to produce.

We are makers of mechanics' hand tools. One of our leading items is a carpenter's claw hammer. The selling price of this hammer to the consumer today is $1. If, in some way, we were able to make two hammers in the time it now takes to make one, and those who supplied us with material and supplies were able to do the same so that we could produce this hammer to sell to the consumer at half the cost, 50c., the consumer would have to buy two hammers in place of one to enable us and those from whom we bought to pay the same amount of wages. The market for nail hammers possesses very little elasticity. At 50c. consumers would buy very few additional hammers, so that if we found ourselves able to make two hammers in the time it now requires us to make one, we should be compelled to lay off nearly one-half our force. This is, of course, looking at the industry as a whole and ignoring any competitive advantage we might possess.

If, on the other hand, we recognized the inelasticity of our market and kept a liberal share of the saving for our own business, we would be able to increase the purchasing power by paying good wages to the employees we retained and better dividends to our stockholders, who would then be able to buy radios that would furnish employment to the employees we could no longer keep busy. This is the thought that I missed in your article. Reductions in cost that bring increased volume of production of commodities that do not possess an elastic market may prove to be more of a curse than a blessing. Reductions in cost that increase profits, increase purchasing power.

FAYETTE R. PLUMB,
President,
Fayette R. Plumb, Inc.

## Maladjustments of Primary Elements Need Correction

IT seems to me that economic depressions are simply maladjustments in the relationship of the primary elements in the machinery of commerce. In this particular instance it should be noted that the country was beginning to emerge from the 1920 depression in about 1923. Inasmuch as a definite improvement had then set in, it would be safe to assume that the major elements of the commercial machine were in a fair state of adjustment. What has taken place since 1923 is a constantly increasing maladjustment which has eventuated in the stoppage of the entire machine.

It is an historical fact that it took three years to start the wheels of industry in motion after the collapse of 1920. It is a matter of record that during the period between the collapse of 1920 and the collapse of 1929 the development of labor-saving machinery reached its peak and that the actual production cost of all commodities was cut almost in half during that period. It is also a matter of record that changes in commodity prices were negligible during that time. Stated in other words, that part of the selling price of all commodities produced during that period which was paid to the primary producers of commodities was reduced by 50 per cent and that part which went into the earnings of corporations was increased by a similar amount. It is fairly obvious that the result of such an economic trend would be the inflation of corporate earnings and the consequent inflation of the value of corporate shares. It should also be fairly obvious that the result of such a procedure would be the continuous diminution of the purchasing power of the wage earners of the nation.

An interesting sidelight on the entire situation, however, is the increase in instalment buying during the period under review. This phase of the economic situation reached its peak in 1928-29 and served the purpose of creating a false purchasing power for the production of the nation to replace the actual purchasing power eliminated by the reduction in the share of the fruits of production distributed among the wage earners. And so for a time the presence of the monkey wrench in the machinery was hidden and the machine went faster and faster to its eventual smash-up.

Instalment buying may properly be considered as the corporate capitalization of the individual and the application of his earning capacity to the purposes of interest and amortization on the debt created by his instalment purchases. It is therefore perfectly obvious that such a program of instalment buying as was initiated in this country during the past decade must necessarily come to a sudden and violent stop when the aggregate earnings of the individuals engaged in the program become insufficient to provide for interest and amortization charges on the debt thus created.

While all this was taking place the investors in corporate shares became inoculated with a vicious type of optimism, which soon abandoned the yardstick of earnings in the measurement of the market value of corporate shares. It therefore became common practice for speculators to purchase shares on borrowed money at prices which were out of all relationship to earnings and under conditions which made it essential for them to derive substantial market profits in order to continue to carry their margin holdings. In-

asmuch as such a situation must of necessity be predicated on continuously accelerating increases in stock values it was from the outset foredoomed to collapse. Simultaneously with the exhaustion of the instalment purchasing power of the masses came the collapse of the stock market in October, 1929, and the wave of inflation which had been founded upon speculative winnings in the stock market on the one hand and instalment buying by the masses on the other hand, crashed against the rocks to the complete confusion of all concerned. The result of this debacle was a situation in which the demand for all types of manufactured goods suddenly disappeared, in which the swollen earnings of corporations suddenly ceased and in which the market for productive labor was suddenly eliminated.

It would seem that such a situation would be entirely hopeless and that the entire economic structure of the country must completely collapse. There are on the other hand natural forces which are apparently infrequently visible to those whom they most affect. As a single instance, in 1929 the price of cotton held steady at approximately 20c. a lb. At the present writing it is below 10c. It is of course obvious that the purchasing power of the country has been tremendously reduced, but it is highly possible to conceive that cotton which was an immovable, indigestible surplus at 20c. will be a circulating commodity at 9c. a lb. It should further be observed that, inasmuch as the entire cotton-raising country was paralyzed by the loss on its 1930 crop, which was in most cases raised on the same scale as the 1929 crop, it will in October, 1931, market a large crop of cotton which has been raised at a cost very much less than half the cost of the crops of 1929 and 1930. It will be further observed that the cost of the 1931 cotton crop has not been reduced through any intelligent effort on the part of the raisers but by the stern necessity of raising a crop with the funds and materials available.

The average cotton farmer's credit has been exhausted since the disaster of 1930. He has not been able to obtain credit at the country store, nor has he been able to obtain funds at the country bank. He has had to raise his own food and feed and he has had to go without the luxuries which he had for some years begun to consider as necessities. The net result of the year's operations will be a crop of cotton valued at something like $700,000,000 which has probably cost in dollars and cents less than $100,000,000 to raise. The difference between these two figures will represent the net return on the operations of the Southern cotton farmers for the 1931 crop.

When this is released by the sale of the 1931 crop, it is my belief that a large part of the financial obligations of the individual farmers will be liquidated. These obligations are mostly due to the country banks and country stores. When these obligations are liquidated the country banks and country stores will be in position to liquidate their obligations to manufacturers and city banks and to obtain and extend further credit. It is well known that a burnt child dreads the fire and it is a certainty that operations for the season 1932 will be on only a slightly larger scale than in 1931.

It should be clear, however, that the turning point of the present depression will be the return of the major crops of 1930-31 and that the simple liquidation of the obligations now outstanding against the farmers of the country will be the beginning of the return of what may be hoped for as a more stable and intelligent prosperity than that which so tragically exploded in October, 1929.

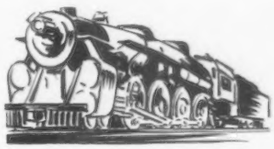
It is very interesting to consider the result of such momentous economic fluctuations as the ebb and flow of wealth between the primary producer and the corporate shareholder. The greater part of all of the fruits of production during the last ten years finally found its way into the hands of the owners of the larger corporations. Shrinkage in the value of these securities, depletion of surpluses through operating losses and numerous other influences which have tended to chasten the hearts of corporate directors have destroyed the major portion of the wealth which was concentrated in the treasuries of the banks and large corporations. At the other end of the cycle there is about to be produced in the hands of the farmers and other primary producers a new surplus of wealth which will again restore normal circulation within the economic system. It is obvious that the same number of hours of labor will not be necessary under the conditions of the next era to produce the commodity requirements of the same world. It is further obvious, however, that shorter shifts and shorter hours will prevail, that more leisure will be available to the individual and that as a result of this change a greater proportion of the fruits and results of world production will be distributed among the masses who participate in that production.

In general, I feel that the United States today is at a point along the economic highway which may properly be compared with 1923. I believe the next era of violent prosperity will begin in approximately three years from October, 1931, during which time the fundamentals for such prosperity will be established. I believe between 1934 and 1938 a boom similar to the 1926-1929 era will be in effect. I believe, however, that the sanity of the business leaders in America will prevent where possible so drastic a maldistribution of wealth as took place in the corresponding period of the last decade, and that the ultimate collapse of the impending era will be delayed a few years longer for that reason.

I further believe that each recurrence of the ebb and flow cycle will result in a less drastic readjustment than the previous one and that in

the end we will learn that the secret of prosperity is not winner-take-all but a constant, even and equitable distribution of the fruits of men's labor among all those who participate in the production thereof.

DONALD McDONALD, JR.,
**Vice-President,**
B. F. Avery & Sons.



## Discard as We Create

THERE is no question but what we have to modernize American industry and American railroads. The thing we need to be very careful about is not to overbuild our industry, but to discard the obsolete as we create the new. I am firmly of the opinion that if all of the obsolete equipment in this country was discarded now, we would not have the impression of being over-built as to production facilities.

GEORGE H. HOUSTON,
**President,**
Baldwin Locomotive Works.

## Two and Two Still Make Four

FORTUNATELY, or unfortunately, I have been through all of the depressions since 1873 and have had an opportunity to study the conditions existing during these depressions and watch the passing away of them.

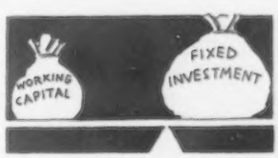
In a way they are all alike and yet they are all different, one from the other. To me it is analogous to a physical disease and the patient is prescribed for very much as a human patient is prescribed for by various doctors. It may be that the consultation that is held over a physical patient does the latter good, more or less. At any rate, nature eventually brings the patient out of the disease and he is restored to health. This economic disease, through which we are now passing, it seems to me, is brought on by natural causes, very much as a physical disease is brought on, and will be cured in the same manner. At any rate, we know they are always cured, and it is simply a question of going along with patience and doing all we can in a quiet way to help our individual selves, that is, each industry doing all it can to hasten the end by careful management, economy and preparation for the future.

As stated above, personally I have seen so many of these depressions that they give me no fright or fear whatever, otherwise than the suffering, more or less, that is a result of unemployment. The only difference between this one and others is that it is more extensive and involves a larger portion of the world than have other depressions, and I suppose that means that the disease may last somewhat longer.

So many attempts are being made in various ways to stabilize business and bring back prosperity, and some of them are rather pitiful to read. The lowering of prices at the present time for the sake of getting business, of course, is a fallacy. We rarely buy on a falling market, whether it is produce or something else, and the lowering of prices now is simply brought about by fear and a false idea that business can be improved. It hurts the business of the future and, **without doubt,** helps to lengthen the period of depression.

Your article is a very interesting one and a very clear analysis of the subject, but, as you very pertinently state, you cannot beat mathematics; two and two will make four in spite of all the juggling that we do.

F. G. ECHOLS,
**President,**
Greenfield Tap & Die Corpn.




## Commercial Banks' Relation To New Equipment

APPARENTLY your journal, together with almost every one else, much overestimates the ability of commercial banks to participate in business. It is quite true that if, with capital which is available, a producer finds it possible to produce a better product at a less cost, he ought to get a definite advantage out of that situation. However, as I see it, it is quite impossible for the commercial bank properly to take any very substantial part enabling the producer to provide himself with improved equipment. I think that you may agree with me to a certain extent, although there is probably a point at which our opinions would pro-

(*Concluded on page 73*)

# WHAT TECHNICAL MEN CAN DO

By H. L. HORNING

President, Waukesha Motor Co.,
Waukesha, Wis.

THE title of this talk ["Why Technical Men Leave Home"] rather irritates me. It seems so deadly at this time, for out of all this economic episode there comes a realization that the world little knows the crushing despair and distress that come to the heart of every executive who must reduce hours or turn men out into a world that does not need them. Men go mad sometimes when their fortunes are swept away, but I have learned from many that this experience is nothing to the pain and anguish which comes in laying off old and trusted employees.

There is a certain type of unemployment in shops and among technical men which comes from the increased efficiency of mass sales and production. This unemployment comes during a period of readjustment and is seldom permanent. The period of readjustment is finally solved by new products within the industry, or by other products outside the industry, which may engage the training of the technical men. It is in these transitional periods, which may be considered minor in a larger sense when applied to only one industry, that the most serious problems of unemployment occur and when it is difficult for industries to stabilize.

At a time like this, when a major world-wide economic readjustment is going on, industry is more or less helpless except where it has built huge cash reserves and has not over-capitalized the earning power of its better years. We hear a great deal of theoretical talk about stabilizing employment. From observation among many industries, it appears certain that the leaders of industry are willing to make almost any sacrifice to keep the organization intact and have devised every possible means of sustaining employment, even to the serious depletion of reserves. Almost universally, every expedient has been exhausted before resorting to reduction in salaries, rates of pay or reduction in organization.

### Valuable Men Are Retained

This brings the matter down to what technical men can do to assure their own employment during periods of readjustment.

Nothing can take the place of value of services to an organization in assuring continuity of service through thick and thin. While there are always extenuating circumstances which apply to some cases, without exception the most valuable men are kept. Periods of great activity must depend on a floating population of less efficient men to fill the demands of industrial activity, and by some it is considered certain that this dilution of efficiency is a contributing cause to the following depressions. During periods of depression dire necessity drives those companies that would survive to clean house.

Next to excellence of service, length of service is, with management, invariably the determining factor whether a man is kept on or not. Then comes regularity of service.

# TO ASSURE THEIR OWN EMPLOYMENT

**TECHNICAL men fail because they are unwilling to make the sacrifice of time and effort necessary to qualify them for larger responsibilities, declared H. L. Horning, president, Waukesha Motor Co., Waukesha, Wis., in addressing the summer meeting of the Society of Automotive Engineers at White Sulphur Springs, W. Va.**

**One reason for their failure to develop their latent powers, in his opinion, is a subconscious pessimism which insidiously saps their courage and brings their aspirations down to the dead level of holding their jobs. Another obstacle to their success is their pronounced individualism—a lack of intimate touch with the world outside the office walls, an inability to understand human nature.**

**Mr. Horning's address, presented in abstract, holds a message both for engineers and for management. Technical men, he says, represent one of the best types our civilization has created. Their untapped capabilities constitute a major challenge to managerial skill.**

The tragedy of every business is the frequent discovery of some man who, having met every demand of the growing company, has finally come to the end of his capacity for further growth. The management is given the problem of what to do with him, how to give him another start or salvage him without losing that priceless gift which is the very fountain of all achievement: a combination of pride, hope, initiative, inspiration and enthusiasm. A broken spirit is the saddest of all human tragedies. The finest work of management is to preserve the spirit while trying to save the man, the investment in him and his further possibilities.

### Want Increased Pay but Not More Responsibility

This coming of men to a stall in keeping up with the business is the most frequent experience in industry, and comes much more often than the case of a man becoming deeply discouraged and voluntarily trying to leave. Our experience is that men in technical positions have very little tendency to break away. Only a few are constantly making the whole effort for advancement, but, in the case of most men, the hope seems to be just to hold their jobs, although this is never expressed and may never reach the level of consciousness. The vast majority of men hope for an improvement in salary, but few are willing to accept the wider responsibility that goes with the higher salaries. I have been led to suspect that there is a layer of subconscious discouragement in most men's hearts, insidiously corroding, which brings their attitude down to this dead level of just holding the job. As business grows, management is likely to become less conscious of the individual and his importance in the company's difficult achievements.

The cost of turnover among technical men is nothing as compared with the possibilities that lie dormant in most of them. The major cause of turnover lies in the choice of men and in failure of management to surround the men with conditions that permit them to produce their best results. The secondary cause lies in the unwillingness of the men to pay the price of success—the sacrifice of time and effort and the constant drive toward perfecting themselves.

### Turnover a Measure of Management Efficiency

In this connection it should be said that management receives its greatest encouragement to help men when it sees and feels the willingness of the men to help themselves. . . . The most discouraging thing to management is to feel that a man is trying to and is living beyond his position. It is remarkable how frequently management becomes discouraged with a young man who shows poor judgment and taste in managing his personal affairs.

Turnover is largely the measure of the efficiency of management in choosing the right person for each position and creating conditions that bring out the best in men. Turnover may not mean so much all

that is lost in the training of the man who leaves, and all the other inferred losses; more than anything else it may mean a low efficiency under which all the remaining men may be working. We may translate turnover into terms of good will. . . . The measure of inside good will of an organization is the ratio between what men are *willing* to give and what they *can* give. Good will means a lower turnover.

**Being Kept Too Close to the Office Is Detrimental**

Technical men should be creative. They are often brought right down to the level of clerks by routine work and the domination of standards and rules. They have a most difficult task of visualizing what the public wants. There in an ever-changing picture in these wants on the one hand, and it must be met by embodying an ever-changing development in technique. More discouragement comes to management from the results of these changes than from any other source, and they are the cause of discouragement to engineers. The picture that technical men get of the public demands is a very inaccurate one and comes through too many hands. The engineer is often kept too close to the office and is not developed enough to see things with the eyes of the user and to feel his mental twist. In many cases these facts are in effect hidden from the engineer, and even when he gets them they are in the form of opinions and opinions of very careless observers. . . . Engineers are often criticized for honest work they do which is predicated on the false information they have received. This results in dissatisfaction and a change of position, or to a loss of caste in the old organization. This is a fault of management for which technical men suffer, and it is one cause of technical men leaving their positions.

Another cause of misunderstanding is the engineers' difficulty in producing conditions in the laboratory that correspond with field service conditions. This is a difficulty that cannot be corrected except with real road tests. Engineers often fail to introduce the factors of sheer neglect, which road service means, or to realize that the ignorant user expects his apparatus to work almost without care. These factors put a blemish in the finished work of the engineer and sometimes are the cause of dissatisfaction in his work.

The engineer often finds that sales and adminis-

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# SUGGESTS WE ARE HEADING

ALMOST 20 years ago, in THE IRON AGE of May 23, 1912, appeared a diagram accompanying a paper by Charles E. Hildreth, at that time general secretary of the National Machine Tool Builders' Association.

The diagram showed a steady sequence of business cycles alternating on an eight, nine and ten-year schedule, peak to peak.

In the 10-year cycles the decline lasted about seven years and the subsequent advance to the new peak three years. In the 9-year cycles there was a 5-year decline and a 4-year rise. The 8-year cycles showed six years of decline and two years of advance.

Mr. Hildreth has been keeping this chart up to date and finds that it has depicted conditions, during the past two decades, in about the same manner as before. The reproduction of the chart indicates that, if these conclusions hold true and history does re-

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**CYCLES of 10, 8 and 9 years, repeated in that order, have characterized movements in pig iron prices for a century.**

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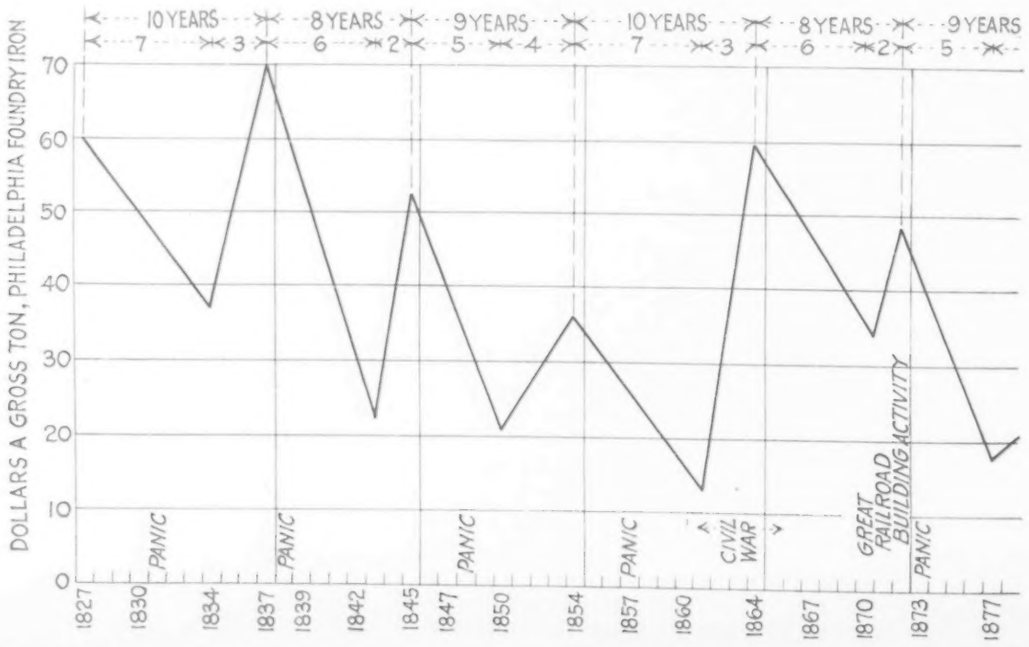

trative ends cannot keep the customer using the product within the limits of service for which it was designed. Matters of policy force engineers, under these conditions, to perform miracles in meeting a new situation. This is a common problem that is most serious to the engineer and very trying to the organization and presents a most serious predicament for the production man. Much discouragement comes to engineers who fail in their performance of miracles.

Some turnover is necessary. The common tendency of all human activities is to slow down. It is characteristic of human nature that, where life is easy, men stagnate and character decays. There is always a need to stir men to action. Dire necessity is always the incentive to achievement. The average man is living up to about one-fourth of his possibilities, and, aside from the ordinary spurs that management may use, a few men losing their positions or leaving the organization may have a salutary effect upon both management and organization. Zero turnover, in itself, is no virtue; it is usually a positive evil. It is the sign of decay. Usually the first thing necessary to save a falling company from itself is to put into effect a much delayed turnover and weed out those who have been allowed to decay; they seldom have to be replaced. How much turnover is necessary to keep an organization in first class condition and how much is excessive is a matter of results, and cannot be stated.

### Causes of Dissatisfaction

Dissatisfaction with compensation is less frequently the cause of turnover among technical men than in any other branch of the service. There is a wide range of compensation among technical men. No system has ever been devised that properly measured the value of technical men. Their compensation is largely determined by what they can get, and is not always based on their value.

Another cause of dissatisfaction among technical men, particularly those of an inventive turn, that comes under the head of compensation is a feeling that the raw conception of an idea should receive a substantial portion of the gross returns. Here there is an entire lack of perspective as to risks and costs and responsibilities of development. This type of

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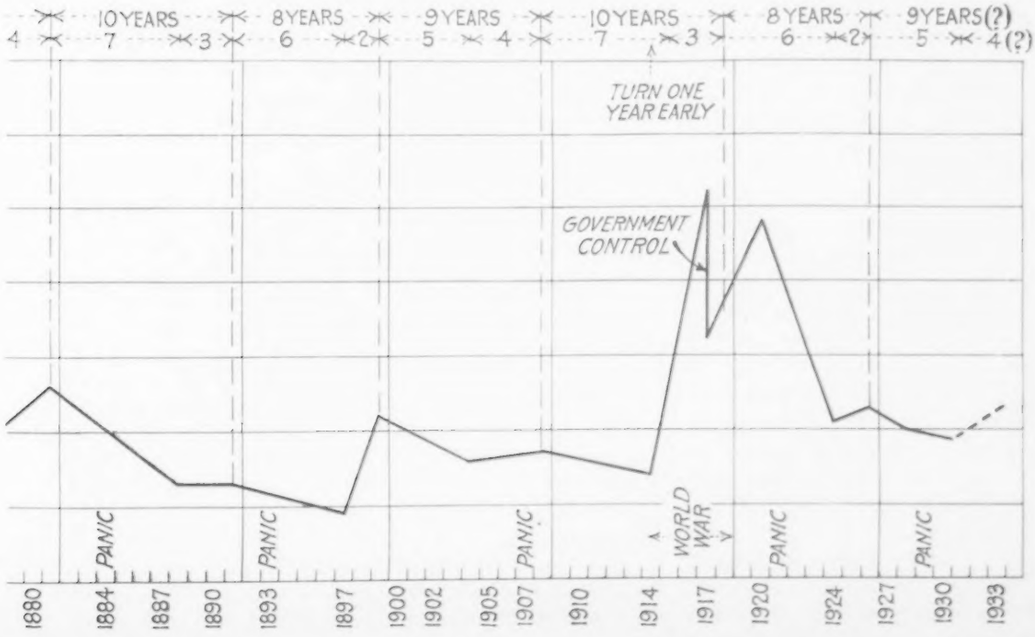
# FOR A NEW PEAK IN 1935

peat itself as indicated, we have made a new low this year and may look for a high about 1935.

Following out the analogy, another major cycle 10 years in length may come after 1935, culminating in 1945 and with its low about 1942.

Points on this chart for several decades have been worked out from quotations on No. 2X foundry pig iron at Philadelphia, as reported weekly in THE IRON AGE. From 1844 to 1874 yearly average prices of Philadelphia No. 1 anthracite foundry pig iron were used. Before that the prices were for Scotch pig iron, as reported by the United States Treasury Department in connection with imports of that commodity.

The World War apparently threw the cycle out by a year or so, for the 10-year interval would have culminated in 1918, whereas the two peaks shown (in 1917 and 1920) took the place of 1918, the interval having been bridged over largely by controlled prices.

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**IT will be noted that the "standard" subdivisions of the full cycles are repeated over the entire period.**

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# SCIENTIFIC RATE SETTING

By T. M. HARRISON
Partner, Stevenson, Harrison & Jordan,
Management Engineers, New York

AT first glance rate setting may seem to be "just another system." However, the lack of it lies at the heart of many a foundryman's troubles. It should be used to cover molding and core making as a means of reducing and controlling direct labor cost, as a basis for standard cost finding, and as a basis for exact estimating.

A large percentage of gray iron foundries, more especially the smaller jobbing foundries, have the day-work method of payment Some of the larger jobbing gray iron foundries and a good many steel foundries use piece work, but unfortunately piece rates in most cases are set merely in accordance with the judgment of the superintendent, foreman or rate setter.

### Two Kinds of Time Studies

Piece work insures lower labor costs than day work, even when the rates are set merely by judgment. Nevertheless, piece prices ordinarily may be considerably reduced by the use of scientific rate setting, which involves stop-watch studies. There are two distinct kinds of time studies—one with reference to the individual pattern or core box, the other with reference to individual elements of the work. In all jobbing foundries, and in many foundries making a standard product, time studying by individual patterns would be a tremendous and more or less continuous task; consequently, we shall deal with the second method—time studies covering elementary operations rather than specific patterns.

Here molding and core making are not merely operations, but each represents a combination of a large number of elementary operations in connection with each of which there is a unit that will properly measure the distinction in labor difficulty between one pattern or core box and another. Molding, for instance, calls for certain flask handling, sand handling, core and supply handling, finishing and other elements. Thus, it is only necessary to establish basic rates, expressed in proper units of measure, in order to make it possible to build up synthetically an over-all time allowance to cover the making of a mold from any pattern in any flask.

In the table are listed numerous elements of floor molding, grouped in accordance with the units by which they are measured. Under this system there are two distinct steps. The first is to make time studies and build charts or tables covering all elementary time allowances. This is a task rapidly completed once and for all. The second step has to do with establishing time allowances for individual patterns and core boxes from the basic data.

In some cases the elements or groups of elements in connection with time studies of elementary time allowances are measured by a single unit of time which is multiplied by the factor representing size, volume, or pieces. In other cases the unit changes with the size, volume or piece and the basic data may best be presented in the form of charts or tables. The "flask handling" elements are a good illustration of this point, as the allowance per 100 sq. in. of flask area varies with the size of the flask and therefore may best be presented in chart form. There are three charts which reflect the varying amount of labor difficulty in making the joint.

### Time Studies Should Be Made Locally

While there is much similarity between the time allowances as established in different foundries of the same type, it is necessary to make time studies locally in order to be sure that the standard times reflect local conditions, equipment and methods. The time required to make these studies varies with the range of the work, but is well spent because of the permanent, basic and vital nature of the information developed.

# REDUCES FOUNDRY COSTS

**DAY work is a luxury few foundries can afford. A good wage incentive system should reduce the labor cost in the average day-work foundry 25 per cent, states the author of this article, which is an abstract of a paper presented at the cost session at the recent annual meeting of the American Foundrymen's Association. He points out why scientific rate setting on molding and core-making operations is important as a means of reducing and controlling direct labor costs, as a basis for standard cost finding, and as a basis for exact estimating.**

In jobbing foundries rate setting is a continuous task, and in any foundry it is a task that must be done whenever a pattern goes into the sand for the first time. To calculate time allowances on specific patterns requires that the patterns be measured and certain computations made. This takes a varying amount of effort according to the type of work.

The compilation for a molding machine pattern may be made in 3 or 4 min. On the ordinary run of side floor jobs the time per pattern may be 6 or 8 min., and on center floor jobs a longer time if the pattern is large and intricate. On miscellaneous work, therefore, a rate setter may readily cover 60 or 70 patterns a day. Since time allowances on these patterns need be computed only once, rate setting in a foundry of average size is likely to be a part-time job.

### Wage Incentives Are Effective

For those who are still using day work, it should be said that wage incentives are especially effective on such largely manual operations as molding and core making. The pace of day workers in these operations is ordinarily slow compared with the pace under any effective wage incentive plan. Piece work or bonus frequently will double the output per man-hour with a large reduction in direct labor costs.

It is a mistake to suppose that a piece work or bonus system does not apply to short runs inherent in jobbing work. Once the elementary times have been established, the rate-setting problem becomes so easy that jobbing foundries no longer have an excuse for operating on a day-work basis. The average foundry executive does not understand or appreciate the difference between piece work and bonus. If he cannot picture piece work in his plant he is likely to draw the erroneous conclusion that no wage incentive system is possible.

The fact is that bonus is so much more elastic than piece work that it may be made to work effectively under almost any condition. Short runs and other difficulties encountered in jobbing foundries may be covered by a properly designed bonus system, even where piece work might not be so readily applicable. Where rates are set by judgment, there is no assurance that two rate setters will get the same results, or even that a given rate setter will get the same results at different times. Scientific basic data, on the contrary, lead to rates that are not only uniformly equitable, but also are ordinarily lower on the average than under "rule-of-thumb" methods.

Day work is a luxury few foundries can afford. A good wage incentive system should reduce the labor cost in the average day-work foundry 25 per cent. Moreover, scientific rate setting will save money compared with rate setting by judgment.

### Unintelligent Competition Is to Be Feared

What foundrymen have to fear is not merely competition so much as unintelligent competition of the member who does not *know* his costs. Any system, therefore, which aids in the determination of costs is important. Elementary time allowances provide a means of predetermining direct labor costs and total costs by individual castings. In other words, they make possible a standard cost system.

Under standard costs the actual cost of operating for the month is accounted for under two heads: standard value of product, and variations from standard.

(*Concluded on page* 52)

# ADVANTAGES OF TWIN-MOTOR DRIVE FOR ROLLING MILLS

By R. H. WRIGHT AND H. E. STOKES
Westinghouse Electric & Mfg. Co., East Pittsburgh

DEVELOPMENT of the twin-motor drive for main rolls is a logical step in the modern trend toward greater mechanical simplicity of rolling mill machinery. The term "twin motor" refers to a form of rolling mill drive in which each of a pair of rolls is driven independently by a separate motor. In a true twin-motor drive the motors may not operate at exactly the same speed at all times. Nor do they depend entirely on the coupling effect of the metal being rolled to maintain correct load division and speed relations.

Independent drive for working rolls has been used for wheel and tire mills, piercing mills, and tube expanders and reelers. In these installations the motors have rotated in one direction only at practically constant speed, and the metal between the rolls has provided an effective coupling and rather definitely fixed the speed and load relations. Reversing beam mills with independently driven edging rolls are also in successful operation.

Experience with beam mills has demonstrated that the speed relations of two reversing motors working on the same piece of steel could be adjusted to take care of varying drafts, with no indications of unusual roll slippage. This experience therefore formed an important step in the development of the twin-motor drive.

When the electrical equipment for a 54-in. blooming mill first came under consideration it was felt that the continuous capacity and maximum torque of the reversing motor should be greater than anything previously used, to provide power to roll heavier sections at higher tonnage rates. Accordingly both 10,000-hp. and 12,000-hp. equipments with maximum torques of 3,940,000 lb.-ft. and 4,725,000 lb.-ft. respectively, were considered. A previous duplicate mill had been equipped with an 8000-hp., 40 r.p.m. drive with a rated maximum torque of 2,500,000 lb.-ft.

For the higher motor torques it was thought that the drive for the new mill could be improved mechanically by eliminating the mill pinions. This mechanical improvement has been realized. But other advantages of the twin-motor drive, such as greater flexibility, greater ease of handling, lower motor inertia, higher average rolling speed and greater tonnage output so far outweigh the expected advantages that the latter now seem insignificant. This, of course, is the history of many developments.

### Reaching Limitations in Shipping Size

Design of reversing equipment for continuous capacities of 10,000 hp. and 12,000 hp. at 40 r.p.m., and good for maximum torques approaching 4,000,000 and 5,000,000 lb.-ft. respectively, presents some interesting problems. A motor with a single-unit armature would have advantages on account of its simplicity and comparatively high efficiency. The maximum capacity which has so far been built with a single-unit armature is 8000 hp. at 40 r.p.m. One such motor has an armature diameter of 180 in.—about the maximum diameter which can be shipped in one piece.

Using present design proportions, about 10,000 hp. continuous capacity at 40 r.p.m., with 3,300,000 lb.-ft. maximum torque, is the largest motor which could be built with a single-unit armature. The inertia of such a motor would be 230 per cent of that of the 10,000-hp. twin-motor drive finally adopted. So, while theoretically it may be possible to build single-unit motors for much greater capacities than are now required, practical considerations such as shipping space and inertia rather definitely fix the limits of capacity which can be built into one armature.

A double-armature motor offers the best possibilities for a single machine of 10,000 or 12,000 hp. capacity at 40 r.p.m. With a double-armature motor of this rating it is necessary to decide whether to use three generators or four generators and which one of four or five possible schemes of main connections should be employed. Even with a double-armature motor the inertia is nearly twice that of a twin-motor drive.

So the construction of electrical equipment for a high-capacity reversing drive is somewhat more complex than for small and medium ratings.

Pinion stands suitable for transmitting torques of 4,000,000 to 5,000,000 lb.-ft. become very large and heavy, and their design and manufacture involve

**USING two motors to drive the two rolls of a reversing blooming mill confers certain advantages in control. In addition, it gets away from the excessive sizes—sometimes involving difficulty in shipping — encountered with single motors of the great powers now required. Some of the factors involved are outlined in a paper before the Association of Iron and Steel Electrical Engineers in Cleveland, June 16, and here abstracted.**

serious mechanical problems. The twin-motor drive therefore offers both mechanical and electrical advantages.

The twin-motor drive finally selected for the 54-in. blooming mill consists of two 5000-hp. 40 to 80 r.p.m. double-armature motors with a combined maximum torque rating of 3,940,000 lb.-ft. Each armature is wound for 350 volts and the two armatures of one motor are connected in series. The two motors operate in parallel and receive power from three 3000-kw., 700-volt generators, connected in parallel. The motor-generator set has a 90-ton, 15-ft. diameter steel plate flywheel, and is driven by a 6500-hp., 368 r.p.m. induction motor.

Mechanical arrangement of the motors, spindles, and rolls is shown. The mill rolls are normally 54 in. in diameter over the collars and the motors are mounted on 83½-in. centers. The relative elevations of the motors and rolls are such that the lower spindle operates at an angle of 2½ deg. and the upper spindle has an angle of 4 deg. below horizontal when the rolls are together, and 5 deg. above horizontal when the rolls are set for maximum separation. The mill spindles are 25 ft. long, which is 4 ft. greater than for a duplicate mill with pinions. The maximum angle of the upper spindle for the pinion drive, corresponding to the same roll separation, is 8.5 deg.

One diagram shows the comparative space requirements and spindle angles of an 8000-hp., 40 r.p.m. drive with pinions and a 10,000-hp., 40 r.p.m twin-motor drive. It will be noted that, with the pinion drive, the spindles operate under the most favorable conditions when the rolls are close together.

### Quietness Characterizes Twin-Motor Operation

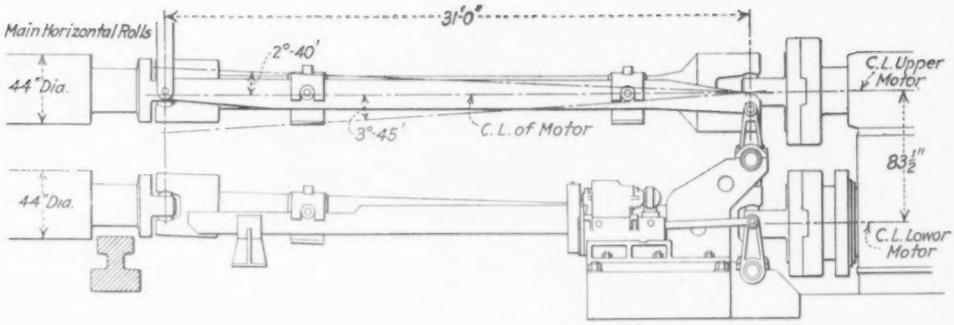
But the heaviest loads usually come when the ingot is large and the upper spindle considerably inclined. With twin-motor drive the spindle angle is a minimum when the rolls are considerably separated, which is more nearly the condition for maximum rolling loads.

Twin-motor drive for 54-in. blooming mill, at upper left, with the lower motor almost hidden under the spindle from the upper unit. In foreground is the flywheel-type motor-generator set.

Operating characteristics of the 10,000-hp. twin-motor drive are quite different from those of a conventional reversing equipment driving through pinions. Probably the first thing which impresses an observer is the quietness of the mill. The steel enters the rolls without shock and the usual vibration and noises in the mill spindles are absent. There is practically no tendency for the mill to chatter when the steel is entered in the rolls.

On this account the roller does not have to exert the usual care in entering the steel. He can enter on the first trial, even at higher speed, and therefore saves time on the early breakdown passes. With twin-motor drive the phase positions of the rolls can shift independently, so that they can quickly adjust themselves to the steel, thus removing the chief cause of roll chatter. On the other hand, with pinion drive the independent movement of the rolls is limited by the back-lash in the pinions and spindles. The lack of real flexibility for independent movement of these parts tends to make the chattering worse rather than to improve it.

Next, the observer will note the unusually high rate of acceleration and deceleration of the mill. This is due to the comparatively low inertia of the motors, which allows the control to be designed for unusually fast field response without causing high acceleration currents and high reverse power currents. The electrical equipment is therefore used to




Arrangement of main spindles for 44-in. slabbing mill with 10,000-hp. twin-motor drive.

better advantage and the capacity for useful work is increased.

**Advantage of Celerity in Changing Direction**

Quick response of the motors increases the entering speed and average rolling speed. This decreases the rolling time and increases the percentage of time the metal is in the rolls. This effect is reflected in the increased power input necessary to keep the flywheel motor-generator set up to speed. An 8000-hp., 54-in. mill drive in the Pittsburgh district has a flywheel set with a 5000-hp. driving motor. Satisfactory operation is obtained with a slip regulator setting of 5000 kw.

When rolling the same weight ingots with the same number of passes, and with practically the same load currents, in the mill with twin-motor drive, a slip regulator setting of 7500 to 8000 kw. is required to keep the flywheel set up to speed. And this is when rolling at a rate which is easily maintained, showing that the rolling is done at a faster rate.

Principal advantages of the twin-motor drive for reversing service can be summarized as follows:

1. **The motor capacity which may be applied to a single pair of rolls is greatly increased.**
2. **Pinion losses, repairs and maintenance are eliminated.**
3. **The motors may be designed to have greatly reduced inertia; resulting in less strain on the equipment, more torque available for useful work, reduced motor and generator heating and faster acceleration.**
4. **Roll chatter and spindle vibration are practically eliminated.**
5. **Higher rolling speeds can be maintained and mill tonnage can be increased.**

Relative first costs of twin-motor reversing drive and pinion drive will vary with the size and torque requirements of the mill. The two motors of a twin-motor drive, with necessary shafting and bearings, are more expensive to build than a single motor of equivalent capacity. This increase in cost may be

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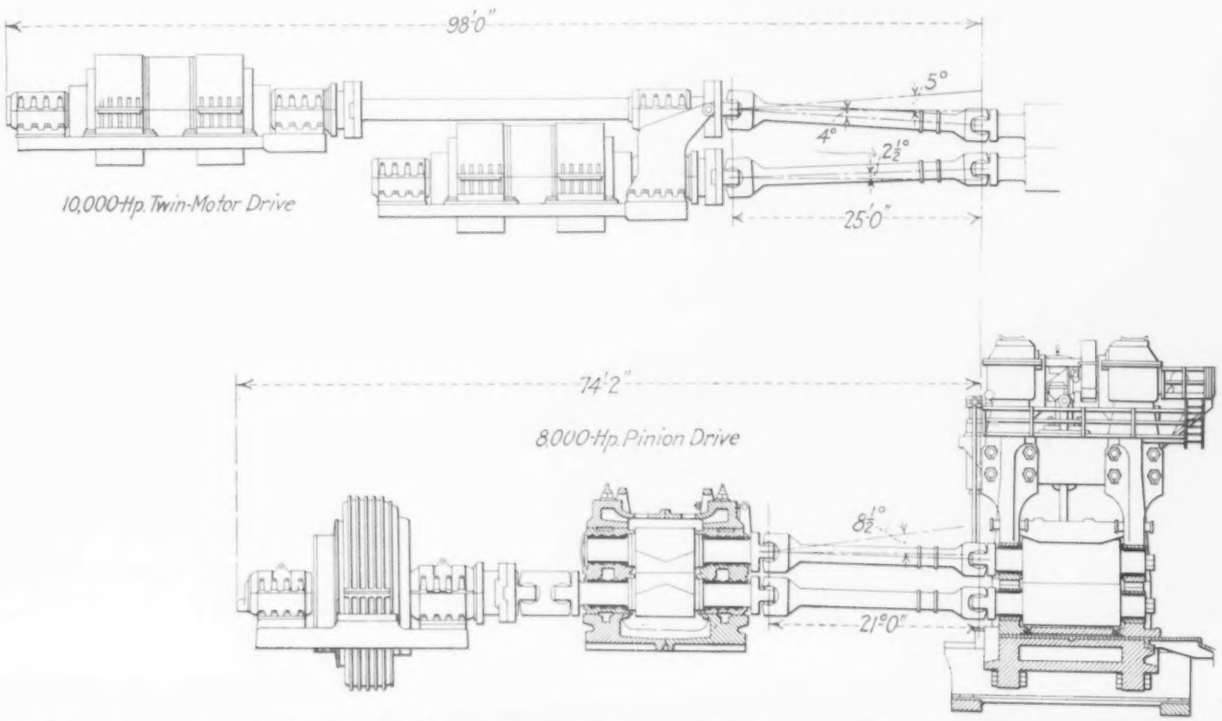



Mechanical arrangement of 10,000-hp. twin-motor blooming mill drive, compared with 8000-hp. pinion drive, both designed for 54-in. mill.

*Ewing Galloway*

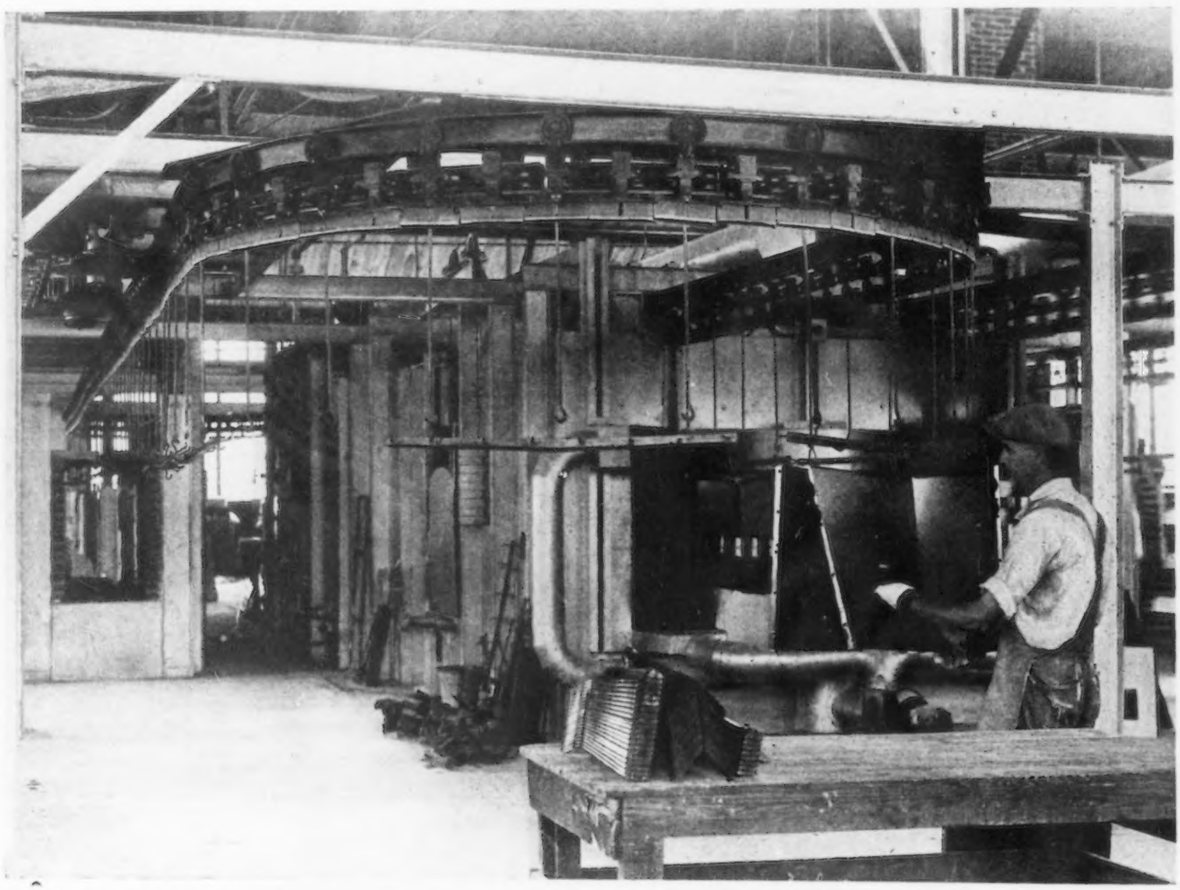
COMPANIONS in industry—the hand and the machine. A combination that has formed the instruments for the building of industry. But both of them subordinate to the brain which commands the hand and to the brain which creates the machine. And all of them subordinate, in turn, to the mysterious urge of progress which all obey.

# ENAMELING MECHANIZED ON

ONE of the latest installations for applying and burning vitreous enamel on steel has a furnace with two overhead traveling conveyors, which extend through it and loop back on the outside. By equipping the furnace with temperature controls the unit becomes automatic and continues in operation. Dipping, spraying, drying and brushing units are placed along the exposed portions of the conveyors, so that all phases of the process are concentrated and conveyorized.

Such an installation is at the plant of the Peerless Enamel Products Co., Belleville, Ill., which conducts a jobbing business for stove and other manufacturers. This plant operates on a mass-production basis and some very unique setups have been devised to speed up the processing and handling of the work. The enameling setup was designed and built by the Surface Combustion Corpn., Toledo, Ohio, the furnace being known as the Beemack type.

This furnace is of the counterflow type, heated with gas, is constructed of brick incased in steel and is designed for more than 1000 sq. ft. of ware an hour. It is 40 ft. in length outside, 12 ft. wide and 8 ft. high, the walls consisting roughly of 9 in. of firebrick and 13 in. of insulation. It is divided into two separate heating chambers, longitudinally, each with an overhead conveyor carrying its load through in a direction opposite to the travel of the

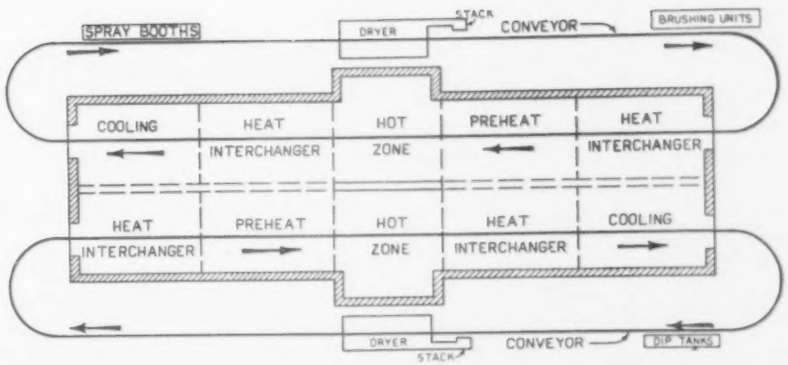


ONE side of one end of the furnace, showing parts coming out after the enamel is burned on and passing to the next operation. A dryer appears at left background. ▲ ▲ ▲

# COUNTER-FLOW PRINCIPLE

By W. O. OWEN
Chicago District Manager, Surface Combustion Corpn.

**AN enameling layout involving duplicate runs through the furnace, with heat interchange between cold incoming parts and hot outgoing parts, is used with great satisfaction in an Illinois plant. Not only is much heat saved by the arrangement of furnace dryers, dip tanks and spray booths, but the handling of materials is greatly facilitated thereby.**




LAYOUT of furnace unit, showing the way heat is interchanged from the outgoing parts to those entering the unit. The arrows show direction of motion of the conveyor in carrying parts through the system.

other, and returning outside of and parallel to the furnace.

These conveyors, of the overhead monorail type, are supported on a steel framework just above the furnace. They carry long tools, which extend down into the furnace through two narrow slits in the roof, and the work is suspended from these tools. The conveyor chains operate on large sprockets, motor-driven through speed-reduction units so that the heating periods can be regulated by controlling the conveyor speed. The chains pass along over the top of the furnace in a special patented airtight steel structure, separate from the brickwork. This prevents both the overheating of the chains and loss of heat through the tool slits.

Each loop conveyor is 73 ft. long and 10 ft. wide from chain to chain and extends 16½ ft. beyond each end of the furnace. Opposite the center of the furnace, on each side, is a dryer, utilizing the waste heat from the hot zone, through which the conveyor passes. The dip, spray and brush units are placed along the conveyors and the work passes through the dryers, after the coats have been applied, so that it can be brushed or edged before entering the furnace to be vitrified.

### Heat Interchange Saves Fuel

Each longitudinal chamber of the furnace is divided into five sections, known respectively as heat interchange, preheat, high heat, heat interchange and cooling zones. The high-heat zones occupy the center section of the furnace, are 9½ ft. in length and contain alloy muffles. The muffle in each hot zone extends through the preheat zone and terminates in a flue which extends to the dryer; waste gases from the dryer are exhausted through a stack.

The hot zone on each side is heated with six low-pressure water-cooled gas burners, set in the outer wall and firing into the muffles. The Surface Combustion principle of gas-air proportioning, so that any furnace atmosphere can be had automatically and continuously, is employed. A duct carrying air under pressure extends along the center of the top of the furnace. This air is fed into the airtight structure, or hoods surrounding the conveyor chains, at the right pressure to keep the heat of the furnace from rising through the tool slots.

Each dryer is 14 ft. long, 4 ft. wide and 6 ft. high. They are constructed of brick and are open at the top, but are hooded so that the products of combustion pass through, from the bottom to the top, and out to the stack. The conveyor, tools and work pass directly through. The openings at each end of the furnace are not closed with doors, as the operation is continuous. But the heat of the furnace is kept in, and cold air is prevented from entering, by a curtain of air. Hot air is sucked from the furnace by fan into a duct which ends in a long, narrow mouth just under each opening and on the outside.

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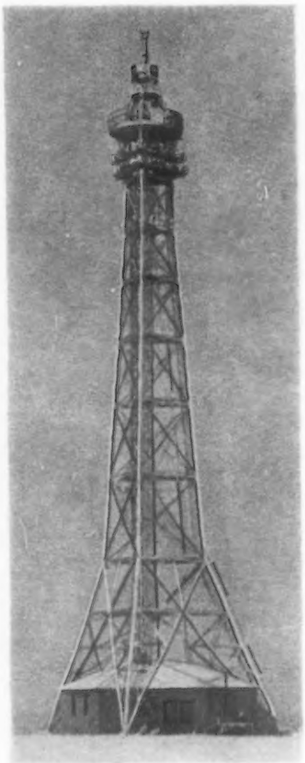


PERMANENT type of mooring mast—being that at the Naval Air Station at Lakehurst, N. J. Photograph was taken after a snowstorm.

# DEVELOPMENT OF PORTABLE MOORING MASTS FOR DIRIGIBLES

By BERAN VON LINDEN LANSDOWNE

WITH one large Government dirigible in active commission and two twice as large now building, and with some nine semi-rigid yacht blimps in civilian ownership and 16 in Government ownership, the portable steel stub mooring mast promises to offer a steel development that will attain some little importance in the years ahead. More, the export of at least one of these masts to Germany, the very heart of the world's dirigible practice and brains, has a significance of its own. The movement now under way under the tutelage of the Goodyear Rubber Co., for providing semi-rigids for private owners as helium-filled, and therefore absolutely safe, air yachts will further expand the field.

With the Government's expansion alone to deal with there will be needed several hundred portable masts, for use on our own mainland and in the colonies at Panama, Hawaii, Guam and the Philippines. They are interesting enough to attract the attention of the steel-conscious individual; but their practical value as a profitable manufacture for the years ahead is of more intrinsic interest to the industry.

So many improvements have been made on what is known as the stub portable mast that what were formerly known as permanent masts are now practically portable masts which may be knocked down and set up anywhere. In fact, the dirigible mooring mast may be said to be, in some ways, always a portable instrument. We find such masts in Hawaii, at San Diego, in Panama, at Lakehurst, N. J., at Dearborn, Mich., and atop the new Empire State Building, in New York.

Many new buildings may be fitted with these masts, for the personal air yacht filled with helium gas is safe, easily handled and superior to the airplane in every way except as to speed. Goodyear is selling them; others will soon be making and selling them.

The Navy Department has built, and is building, several types of stub mooring masts. In general there are three classifications recognized: (1) mobile mast; (2) fixed stub-mast; (3) temporary, or expeditionary, type stub mast. Types 1 and 2 are generally coupled with more or less complete installations of winches, fuel, water and gas supply, stern carriage, and railroad track or carefully prepared path over which the stern carriage may travel. [An example of Type 2 was shown in THE IRON AGE of April 30, page 1449.]

Type 3, or expeditionary masts, are essentially steel poles with a rotatable cup in simplified mounting at the top. They are guyed for strength and may be erected with a minimum of time and expense. A stern carriage is required, but if carefully designed a minimum of preparation of a path will be involved. Such more or less crude arrangements have served in the past for mooring airships for short periods, notably the Los Angeles at Panama and Cleveland and the

**THE air age is steadily creating new demands for materials. One of the requirements of air stations throughout the country will be mooring masts to accommodate both small and large dirigibles. These masts will absorb a sizable quantity of structural steel. How they are put together and used is told in this article.**

Graf Zeppelin at Los Angeles. But in each of these cases a full landing party of 250 to 400 men was available. The airship was landed on the ground into the hands of this ground party and was then "walked" over to the mast and there secured.

An approach to mechanical methods of mooring is not possible unless a stern carriage is provided, able to accept a down load of at least 5 tons; more would be better. One mooring winch at least must be supplied for pulling the ship down by one wire, while the trail ropes dropped from the ship are led out and manned to act as side-steadying or "yaw" lines.

Small semi-rigid blimps need no such crews, and may be directly moored to the mast.

The strength of mooring masts depends upon the size of airships they are to serve, and maximum wind velocities. With recent increases in size of large ships, earlier masts have become relatively weak and can be used only subject to limitations. Considering the fact of air-yacht development, we shall need small masts on the one hand; on the other hand, for the increasing sizes of large ships, we shall need large, powerful masts.

As examples of mast strength, the high mast at Lakehurst was designed for a working load of 16,000 lb. pull by the airship in any direction, plus the direct wind load on the mast itself, with a factor of safety of four. This is in accordance with the usual practice in structural engineering. It is understood that recent British mooring masts are designed for a pull of 30 gross tons (67,200 lb.) by the airship, with a factor of safety of two.

It is now, and probably will remain, customary to design airships strong enough to ride at a mooring mast in winds of velocities up to 60 or 80 miles an hour. An approximate expression for the force exerted by an airship at a mooring mast is:

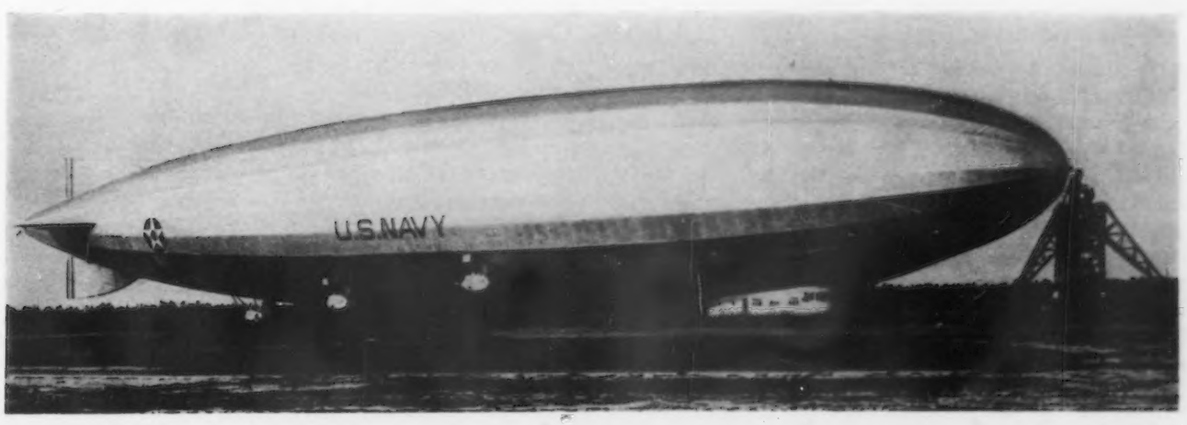
$$F = \frac{V^{2/3} U^2}{3{,}000}$$

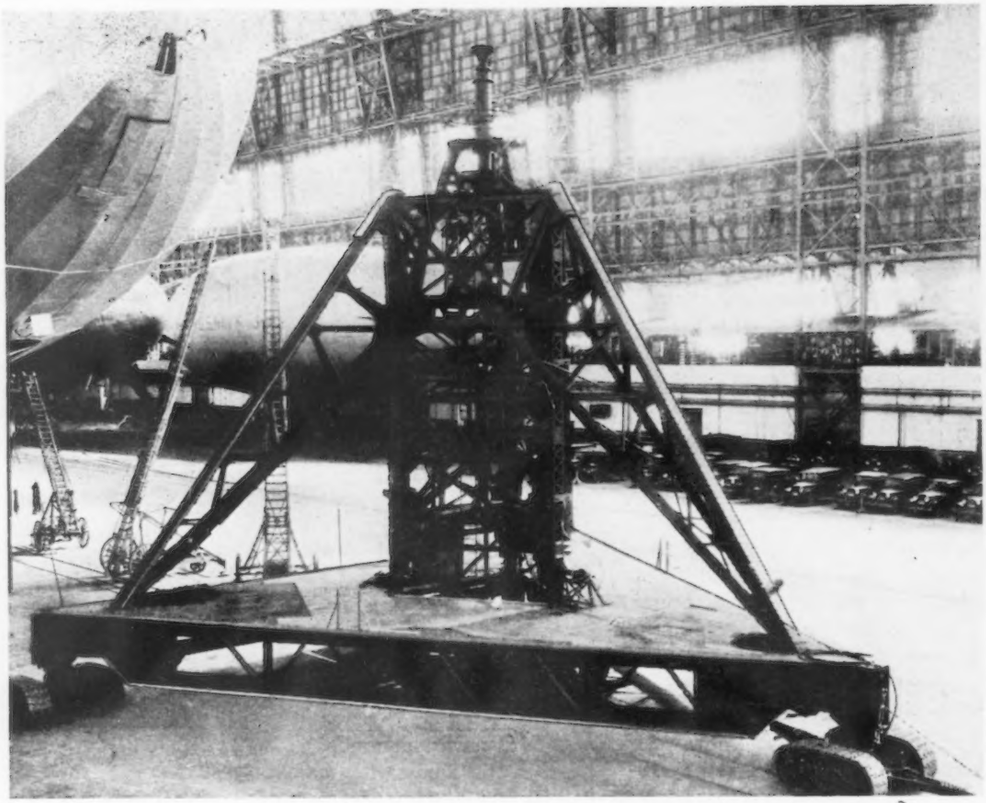
Where F equals the force in pounds.
V equals the nominal volume of the airship in cubic feet.
U equals the wind velocity in miles an hour.

Example: The maximum force exerted by an airship of 6,500,000 cu. ft. volume lying to a mast in a 70-mile wind is given by:

$$F = \frac{(6{,}500{,}000)^{2/3} \times (70)^2}{3{,}000}$$
$$= 57{,}000 \text{ lb.}$$

Portable mooring unit at Lakehurst with the Los Angeles moored to it. The ship rides so close to the ground with this low mast that a stern carriage must be provided to which the ship is attached, and which will prevent it from bumping in gusty weather.





MOBILE mooring mast at Lakehurst Naval Station, showing the caterpillar tread at the three corners. The deck, when in service, carries several winches for hauling the dirigible down to the mooring unit.

The ultimate strength of the mast should obviously be greater than that of the ship. But, since airships are designed for structural factors of safety of only about two on the maximum calculated stresses, there is no need to follow the civil engineering practice of providing a factor of three or four in the mast. A factor of safety of two and a half to three is ample.

Recently, attempts have been made toward international standardization of mooring mast cups and cones, as well as fuel and other connections. Cups and cones are practically standardized now, but increases in size may become necessary in the future.

## Advantages of Twin-Motor Drive for Rolling Mills

(*Concluded from page* 14)

somewhat less than the cost of a pinion stand with spare pinions and bearings, in the case of a heavy mill, and somewhat greater for a light mill. In general, the difference in total cost is not great and is a minor consideration as compared with the advantages of twin-motor drive.

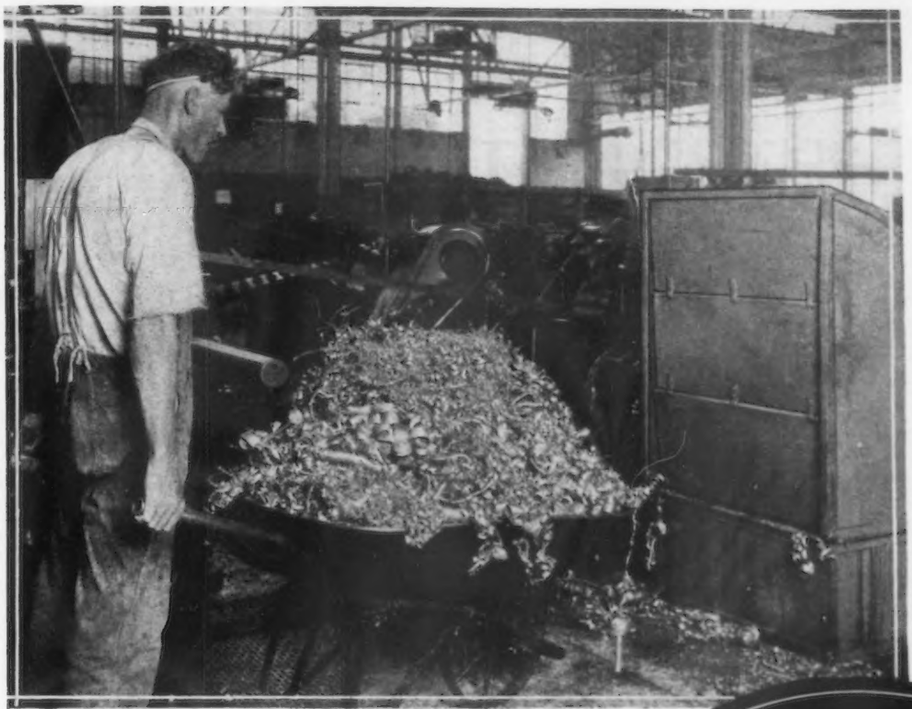
Twin-motor drive offers advantages for wide strip mills, both for hot rolling and for cold rolling. The chief advantage is that the elimination of the mill pinions does away with the necessity for accurate matching of the mill rolls. In either hot rolling or cold rolling, unless the rolls are very accurately matched, extremely high stresses are set up in the pinions to cause the larger roll to slip and equalize the delivery speeds. With twin-motor drive the motor speeds easily adjust themselves so that each roll has the same surface speed. The problem of load division is quite simple, as wide, thin material forms practically a 100 per cent coupling between the rolls.

Answering a question, the author said that there is no definite lower limit at which twin-motor drives become uneconomical. So much depends upon the matter of a steady flow of metal through the mill that no such point can be figured. It is not merely a question of the cost of installation, but of the increased tonnage hourly which can be had from a mill having such a drive, which would offset a considerable addition in installation expense.

For many reasons the ideal arrangement would be to place one motor on each side of the mill. This would obviate the necessity of carrying the drive shaft for the upper roll across the top of the lower motor, and would ease somewhat the matter of angles on which the spindles operate. Ordinarily, however, mill managers will not permit this separation of the motors, as the space at one side of the mill is needed for other purposes.

Below about 8000 hp. it is always possible to use a single-armature machine. This reduces the installation cost somewhat. The double-armature machine can be used satisfactorily, however, as far down as 6000 hp., and, of course, it always makes for a smaller outside diameter, and easier shipping and handling conditions.

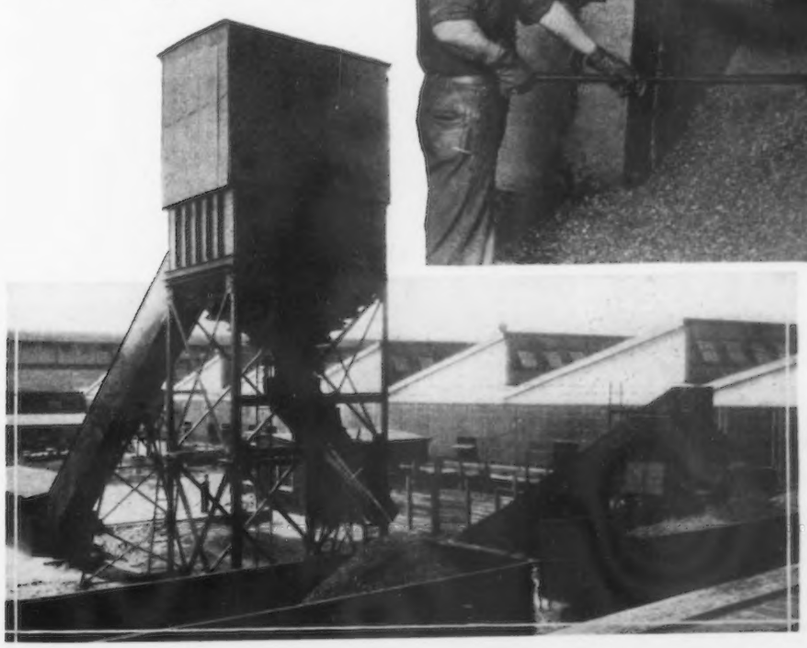
# TAKING OUT THE CURLS



*Photographs, courtesy of American Pulverizer Co., St. Louis.*

FROM 25 to 30 tons constitute a carload of these bulky, curly steel turnings. When crushed to shoveling size, one can get from 40 to 45 tons in an average car. Here is a load going to a crusher via a chip chute.

NOT only are the crushed turnings more economical to handle, but they facilitate storage and often command a price differential. This picture shows what the crusher does to the curly turnings. They are reduced to chips. (At Right).



IN CHIP form, steel turnings are easily stored and handled. A sufficient quantity may be accumulated to enable full car loadings from the plant for mill shipment. This avoids the necessity of disposing of them in small lots locally. (At Left).

# A THERMAL STUDY OF AN

By WILLIAM M. HENRY
Chief engineer, Newburgh works, American Steel & Wire Co., Cleveland
And THOMAS J. McLOUGHLIN
Fuel engineer, Duquesne works, Carnegie Steel Co., Duquesne, Pa.

TO obtain definite and accurate information of the pressure, draft, temperature and volumetric conditions existing in the open-hearth furnace system, an investigation was conducted on one of the 60-ton basic open-hearth furnaces at the Newburgh Steel Works of the American Steel & Wire Co., Cleveland. Observations were made simultaneously on the other three similarly constructed furnaces to determine whether the conditions observed during test were representative of average practice. While it was generally recognized that certain changes in fuel practice might lead to economies, it was considered desirable to make the test under existing conditions, and later to determine in detail the procedure which might be used to effect improvement.

### Description of Furnace

Furnace hearth is 32 ft. 8 in. long by 15 ft. 10½ in. wide, giving a hearth area of 519 sq. ft., while the ports are 8 ft. 3 in. wide by 3 ft. high, making a throat area of 24.5 sq. ft. The bottom is surfaced with 8 in. to 12 in. of magnesite; the roof and side walls are built of silica brick, the roof thickness being 12 in. with 15-in. ribs. The floor of the gas port is lined with magnesite brick, but the remainder of the port construction is silica brick. The furnace has a sloping back-wall and the doors, frames and bridge walls are water-cooled. Metal-case magnesite brick is used for the bulkheads on the ends of the furnace.

The regenerative system consists of four checker chambers, two on each end of the furnace, and the necessary flues connecting with the stack and furnace ports. The chambers were originally built when producer gas was used as fuel, the outside chamber being 27 ft. 4½ in. long by 8 ft. wide and 18 ft. 6 in. deep and the inner chamber 5 ft. wide. Construction of the regenerative chambers is typical of present design.

The checker brick, 3 in. x 6 in. x 15 in. in size,

CONDENSED HEAT BALANCE

| Heat Supply | Thousands B.t.u. |
|---|---|
| Calorific and sensible heat in fuel | 397,456 |
| Sensible heat in air for combustion | 90,885 |
| Heat added by chemical reactions | 58,384 |
| Infiltrated air: | |
| (a) In checkers | 195 |
| (b) Flues | 744 |
| Total | 547,664 |

| Heat Delivery | Thousands B.t.u. | Per Cent, Based on Total Heat | Per Cent, Based on Heat in Fuel Only |
|---|---|---|---|
| Absorbed by steel | 110,673 | 20.21 | 27.84 |
| Absorbed by chemical reactions | 14,190 | 2.59 | 3.57 |
| Absorbed by combustion of $H_2$ (latent) | 34,647 | 6.33 | 8.72 |
| Absorbed by cooling water | 19,660 | 3.59 | 4.95 |
| Radiated from bath and port ends | 81,853 | 14.95 | 20.59 |
| Absorbed by air in checkers | 90,008 | 16.43 | 22.65 |
| Radiated from checkers | 15,353 | 2.80 | 3.86 |
| Radiated from flues | 10,979 | 2.00 | 2.76 |
| In waste gases in stack | 170,301 | 31.10 | 42.85 |
| Total | 547,664 | 100.00 | 137.79 |

# OPEN-HEARTH FURNACE

**ONLY one-fifth of the heat entering the open-hearth furnace reappears in the steel, according to a paper read May 22 before the American Iron and Steel Institute at New York. More than 31 per cent goes up the stack, unless waste-heat boilers are used to entrap it. Radiation takes almost one-fifth of the total. How these quantities were determined is told in the paper, of which an abstract is given here. Nearly one-half of the orginal paper consists of the tabulated results of the tests.**

are laid loosely in the checker chambers to form a number of vertical flues or chimneys and expose the maximum surface. The brick are laid with 6-in. openings, giving a total heating surface of 12,672 sq. ft. on each end of the furnace. The furnace regenerative system is carefully constructed so that air infiltration is reduced to a minimum.

Each regenerative chamber roof was insulated with two 1½-in. layers of a high-grade insulating material and, in addition, was covered with a coating of insulating cement. The side walls of all chambers above the ground were covered by a ¼-in. coating of insulating cement. The stack is 6 ft. in diameter and 150 ft. high, and is equipped with a motor-operated water-cooled damper.

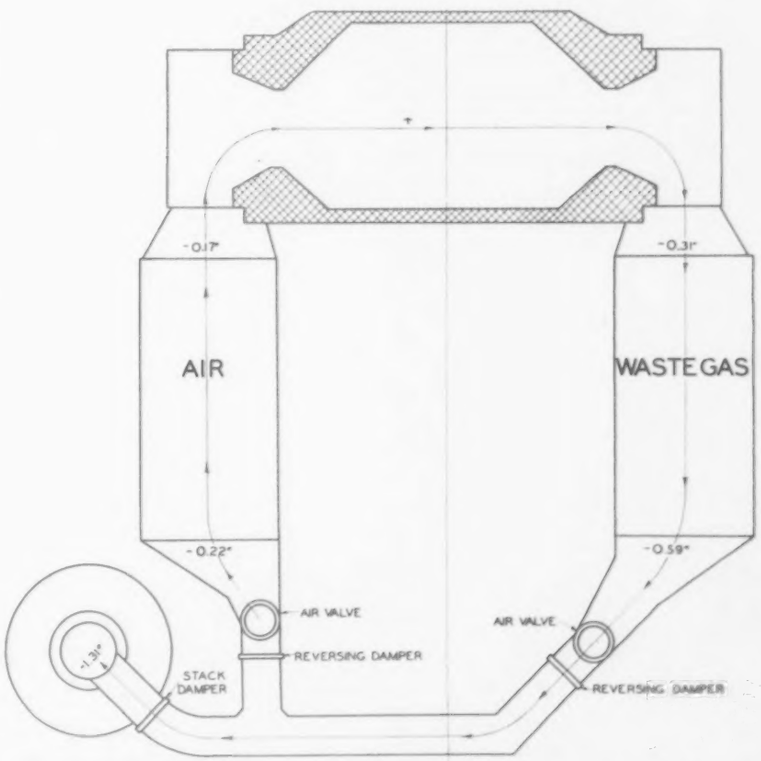
Fuel used on the furnace was coke-oven gas and oil. The coke-oven gas, regulated to a pressure of 3 lb. at the open-hearth, was introduced into the ports through 4-in. pipes located on each side of the port. Water-cooled oil burners were placed in each end of the furnace. Oil at a temperature of 140 deg. F. was pumped through a circulating system at a pressure of 70 to 75 lb. and was atomized in the burner by saturated steam at a pressure of from 70 to 80 lb.

### Calculation of Heat Balance

Calculation of the balance starts with a consideration of the various elements and compounds entering into the charge, and those which are the result of the metallurgical reactions taking place during the heat. Material balances have been made to determine the gases evolved during operation and the oxygen requirements of the process.

Since in most of the published data the volumetric method of presenting all gas data has been used, the same method was followed in working up these data. However, as the furnace was fired with both solid and gaseous fuel, this necessitated the calculation of a hypothetical gaseous fuel, calculated from the quantities of fuel oil and coke-oven gas used.

One of the most difficult problems encountered was the measuring of the air which enters the furnace system. Preliminary tests were made on this furnace in which a metered quantity of air, delivered by a fan, entered the system. From this the radiation loss from the checker chamber was determined, and later checked by calculation with observed surface temperatures of the outside brickwork of the




1—Drafts in the furnace system in heat balance test of open-hearth furnace. Drafts are shown in inches of water

regenerators. After having determined this loss, the volume of air entering the furnace, operating under normal conditions of natural draft, was readily obtained from the known quantity of heat extracted by the checkers from the waste gases, and the measured temperature rise of the air entering the furnace.

In the heat balance table all quantities of heat are calculated above 60 deg. F. and all temperatures are in degrees Fahrenheit.

### Discussion of Balance and Results

In any reversing cycle, a maximum temperature difference between waste gases and brickwork exists at the moment after reversal. At that moment the transfer of heat from waste gases to brick is greatest. As the cycle progresses, the temperature difference between brick and waste gases decreases, and the rate of heat transfer from waste gases to brick falls off in the same proportion.

Practical observations indicate that, during an average cycle, a temperature difference of at least 250 to 300 deg. F. must exist between waste gases and regenerator brickwork in an open-hearth furnace. On the reverse cycle, when air is being heated in the regenerator, the converse is true. The air temperature can never equal the temperature of the brickwork in the regenerator. Observations indicate that at least 250 to 300 deg. F. is the practical limit of temperature difference between air and regenerator temperature.

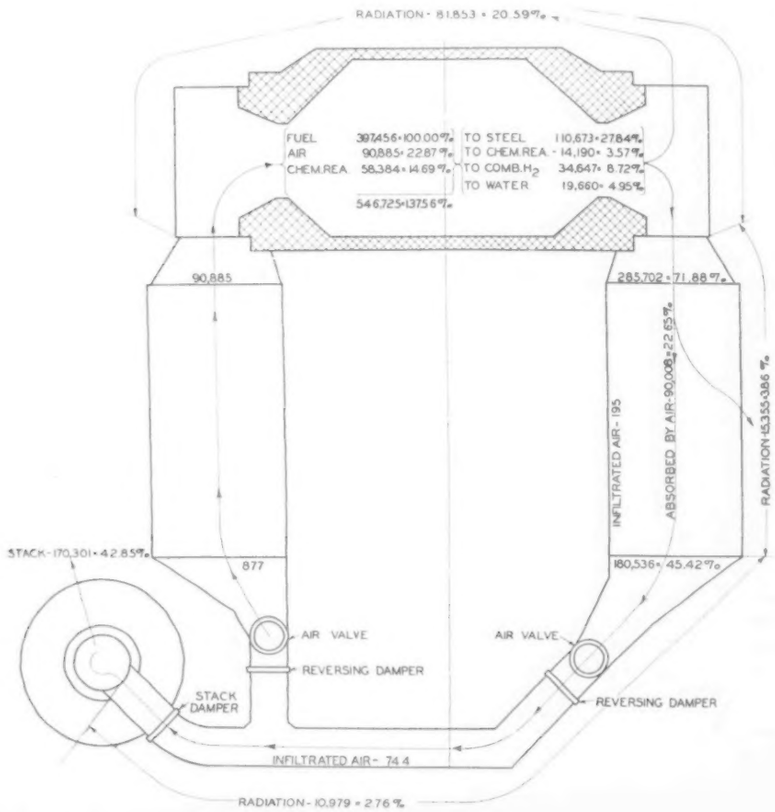
Hence in practice the waste gas temperature must be at least 500 to 600 deg. F. greater than preheated air temperatures. When this condition has been obtained, increased air temperatures can result only from increased waste gas temperature.

### Distribution of Heat in System

To the open-hearth operator the fuel consumption of a furnace is expressed as millions of B.t.u. per ton of steel produced. But the distribution of this heat in the furnace system can be brought out only in a thermal balance. Figures on this distribution, illustrated by the balance, must, of course, be considered in conjunction with the size of the furnace and the tonnage per heat.

In this case, with a heat of 64.4 tons, 397 million B.t.u. entered the furnace as fuel and 91 million B.t.u. was brought in with the air for combustion. In addition, 58 million B.t.u. was liberated as a result of the metallurgical reactions in the bath, giving in round figures a total input of 546 million B.t.u.

Of this total, 111 million B.t.u., or 20.3 per cent, remained in the steel and slag at tapping; 14 million, or 2.6 per cent, was absorbed in metallurgical reactions; 35 million, or 6.4 per cent, was absorbed in burning the hydrogen of the fuel; 19 million, or 3.6 per cent, was taken up in cooling water; and 82 million, or 15.0 per cent, lost in radiated heat from the bath and port ends, leaving 285 million, or 52.2 per cent, to be carried into the regenerators as sensible heat in the waste gases. Of this heat entering the checkers, 105 million B.t.u., or 36.9 per cent, was absorbed by the checkers and 180 million B.t.u., or 63.1 per cent, discharged to the air.




2—Distribution of heat in the furnace system in heat balance test of open-hearth furnace. Heat is shown in thousands of B.t.u.; percentage is based on total heat in the fuel.

Of the 105 million B.t.u. extracted from the waste gases by the regenerators, 91 million, or 85.7 per cent, returned to the furnace with the air for combustion and 15 million, or 14.3 per cent, was radiated from checker chamber roof and walls. Distribution of heat in the furnace system is shown diagrammatically and the percentage figures are given in terms of total heat of fuel, rather than of total heat input.

It is quite significant that 180 million B.t.u., or 45.4 per cent of the calorific value of the fuel, and 63.1 per cent of the sensible heat in the waste gases entering the checkers was discharged into the stack and was of no further use in the metallurgical operation of making steel. This, coupled with the fact that only 58.2 per cent of the air for combustion entered the port, indicates that considerable economy may be effected in the more complete and efficient regeneration.

Extent of the losses due to radiation is illuminating: 20.59 per cent of the calorific value of the fuel is lost in radiation from the bath and port ends of the furnace; 3.86 per cent from the regenerators and 2.76



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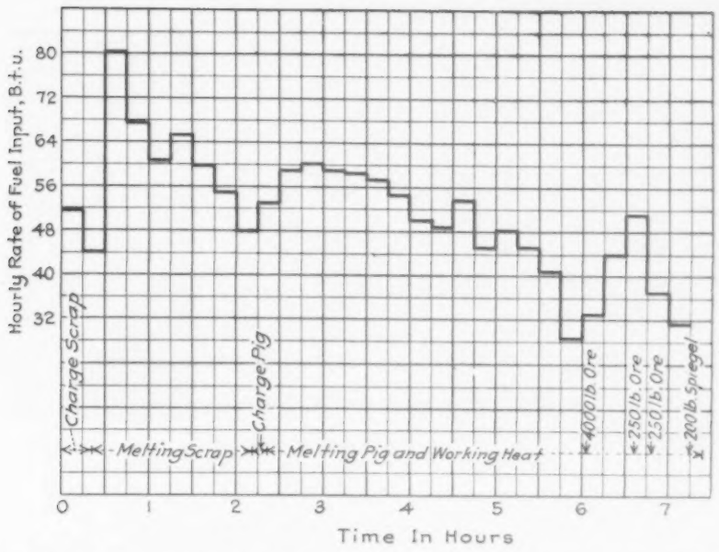



4—Rate of fuel consumption in million B.t.u. an hour to furnace during heat balance test of open-hearth furnace.

per cent from the flues after the regenerators. The following table gives the radiation figures in B.t.u., percentage of total heat input and percentage of calorific value of fuel:

| | Radiation Losses, Thousands B.T.U. | Percentage of Total Heat | Percentage of Caloric Value |
|---|---|---|---|
| Bath and port ends | 81,853 | 14.95 | 20.59 |
| Checker chambers | 15,353 | 2.80 | 3.86 |
| Flues | 10,979 | 2.00 | 2.76 |
| Total | 108,185 | 19.75 | 27.21 |

The extent to which the radiation from the bath [furnace brickwork?] and port ends can be reduced by insulation depends on furnace construction and is subject to question, because of the probably shorter life of brickwork which is insulated. That economy is effected through insulation of checker chambers is apparent. But the extent to which insulation should be carried is purely dependent on local conditions of construction, fuel cost, available stack draft, and value of waste heat in steam generation.

### *Discussion on Thermal Balance*

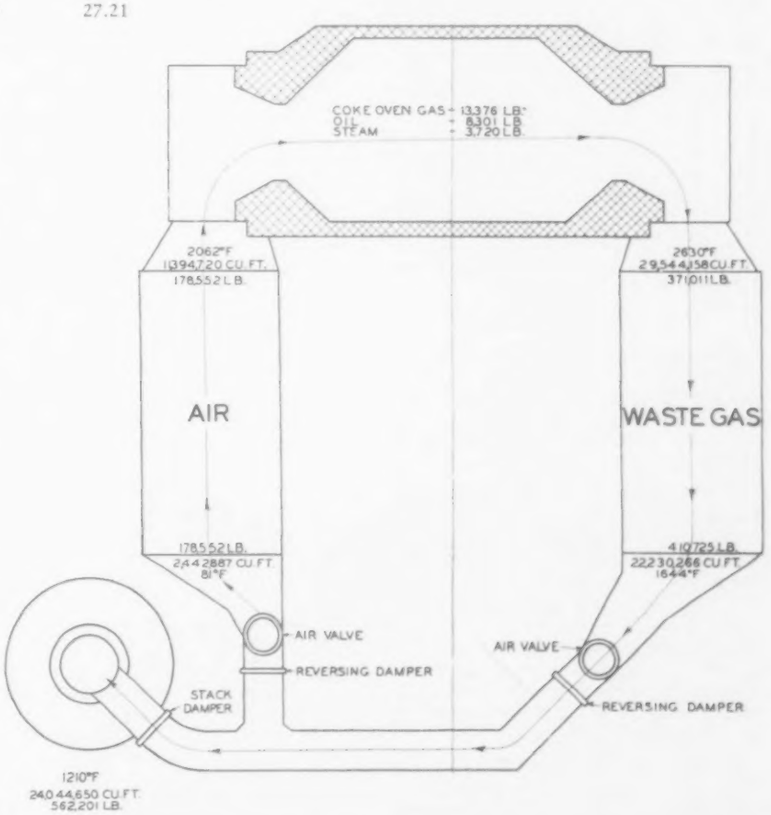
TRANSFER of heat from the flue gases to the bricks of a regenerator takes place almost entirely through radiation, according to Prof. W. Trinks of the Carnegie Institute of Technology, in discussing Mr. Henry's paper. The reverse transfer, however, from the hot bricks to the incoming air takes place by convection as stated in that paper.

High temperature in the air and gas, according to H. H. Siebert, fuel engineer, Bethlehem Steel Co., Bethlehem, will mean a hot flame for the bath. This is the driving force employed in making steel. On it depends whether the furnace is fast or slow in performing its appointed task.

While the loss of heat in water cooling is about 5 per cent, as stated in the paper, this is a relatively minor matter, because there are other preventable losses of greater magnitude. The unsymmetrical layout of a furnace about the center line of the bath, such as was indicated in the illustrations in the paper, gives poor operation. It is uneconomic because it causes an unbalanced condition.

Existing 75-ton furnaces are found able to run on a heat consumption of 4,250,000 B.t.u. for each ton of ingots, while making 6000 tons of ingots a month. This is a much better operating rate, and particularly a greatly more favorable fuel-consumption rate, than was indicated by the author in his paper.

Mr. Siebert strongly advocated a policy of management wherein the best of designing talent would be applied to the many problems involved in open-hearth plants. Automatic control for combustion was alluded to as a specific matter requiring expert engineering supervision.




3—Temperature volumetric conditions in heat balance test of open-hearth furnace. Weights are stated in pounds and volumes in cubic feet at existing conditions in the furnace system.

F. O. CLEMENTS
President

# Testing Society Holds Annual Meeting in Chicago

## Notable Symposium and An Exhibition Are Features —New Record Made in Attendance

S. T. WAGNER
Vice-president

TWO features stand out as stamping the thirty-fourth annual meeting of the American Society for Testing Materials a pronounced success—the largest registered attendance of members and visitors in its history and the presentation of an epoch-making symposium on metals under high-temperature use. An added feature was the first exhibition of testing equipment ever held by the society.

The large attendance was a surprise, even to the most enthusiastic advocates of a Western meeting place. For many years the society has held its annual conventions at Atlantic City, N. J. Yielding to a desire of its Western members, the 1927 convention was held at French Lick Springs, Ind. The attendance there was under 900. The Chicago meeting last week at the Stevens Hotel, June 22 to 26, had a registration of nearly 1450, eclipsing the previous record of 1092 at Atlantic City in June, 1930. Of the total about 570 were guests. The anticipated restraining effect of the business depression did not materialize.

### Technical Features Many

The symposium on "The Effect of Temperatures on the Properties of Metals" brought out 28 papers comprising 620 pages in pre-printed form. A review is published on other pages in this issue.

There were also three other symposiums, one "On Malleable Castings," which was conducted jointly with the American Foundrymen's Association, one on "Abrasion Testing of Rubber" and on "Weathering Characteristics of Masonry Materials." The malleable symposium is the first of four to be held in succeeding years. The second one will be "On Steel Castings" to feature the 1932 convention in Atlantic City.

Besides the papers comprising the symposiums on malleable castings and on metals at high and low temperatures, there were approximately 20 technical contributions in addition on various subjects relating to metals, both ferrous and non-ferrous, and some 25 reports of the society's many important standing committees on specifications and on research. Details of some of these will be published later. Chief points in some of the reports by the principal metal committees were reviewed in THE IRON AGE, March 26, page 1053. At the March meeting many of the final reports were formulated, representing the year's work in specification building and in research activities.

### A Monthly Journal Suggested

IN his annual address at the dinner, Wednesday evening, June 24, K. G. Mackenzie, president, in discussing future needs made the following comment:

> The question of a monthly journal, dealing with materials of engineering and published by the society, is one that has been in consideration only with considerable trepidation. President Farmer (in 1925) believed that it was possible and desirable and I agree with him without reservation. We are all proud of our annual volumes of *Proceedings*. We all know that they contain very valuable material, but most of us, I am afraid, when we receive them the latter part of each year, place them aside with the very excellent resolution that we will read them as soon as we have time. * * * We must admit that we are all more likely to read, or at least skim over, articles which are brought to our attention monthly than to attempt to read a volume of 1000 pages. * * * The average author realizes that he receives much greater recognition for his work if it appears in a technical journal of high standard than if it is simply published in the bound proceedings of some society. Possibly a monthly journal is still far in the future—eventually it must come.

▲ ▲ ▲

## New Officers

**President:**

F. O. Clements, technical director, research laboratories, General Motors Corpn., Detroit.

**Vice-Presidents**

S. T. Wagner, consulting engineer, Reading Co., Philadelphia.

Cloyd M. Chapman, consulting engineer, New York (senior vice-president, elected in 1930).

**Members of the Executive Committee:**

Arthur W. Carpenter, manager of testing laboratories, B. F. Goodrich Co., Akron, Ohio.

K. B. Cook, technical manager, Manville Jenckes Co., Pawtucket, R. I.

G. C. D. Lenth, consulting engineer and secretary, Clay Products Assn., Chicago.

O. L. Moore, engineer of tests, Universal Atlas Cement Co., Chicago.

J. B. Johnson, chief, materiel section, Air Corps, U. S. A., Wright Field, Dayton, Ohio.

▼ ▼ ▼

President Mackenzie called attention to the following interesting facts concerning the society's growth:

In 1930 there were 584 standard and tentative standard specifications against 515 in 1927.

In 1931 there were 50 standing committees with a membership of 2500 against 45 in 1927 with 2184 members.

In 1930 there were 883 pages of printed committee reports, with 465 in 1929 and 616 in 1928.

In 1930 the number of technical papers was 76 as compared with 58 in 1929 and 46 in 1928.

### Net Loss in Membership

The annual report of its executive committee contains the usual details of the year's activities in its 29 printed pages.

As of June 1, 1931, there has been a net decrease of 28 with the total membership 4327 against 4355 a year ago. There was a net gain of 12 in individual members and of 11 in junior members but a net loss in company membership of 51, making the net loss in the total of 28. There was a loss of 26 members by death.

### The Edgar Marburg Lecture

A few years ago the Edgar Marburg lecture was established in memory of the society's first secretary. A prominent scientist has delivered this lecture each year since.

This year the sixth lecture was delivered by Dr. A. Nadai, research engineer, Westinghouse Electric & Mfg.

Co., Pittsburgh, and a member of the faculty of the graduate school of the University of Pittsburgh. He read a masterly address on "The Phenomenon of Slip in Plastic Materials," in which subject he has carried out considerable research.

### Dudley Award at Informal Dinner

At the Atlantic City convention of the society an annual dinner is not usually held. The last one was at the French Lick Springs meeting in 1927. This year about 200 attended an informal dinner in the ball room of the Stevens, with Prof. H. F. Moore, University of Illinois, as toastmaster.

An address of welcome was delivered by Col. Robert I. Randolph, president, Chicago Association of Commerce, followed by the annual presidential address by K. G. Mackenzie, already referred to.

Formal award of the Charles B. Dudley medal followed. The presentation of the recipient was made by Dr. H. W. Gillett in the absence of the chairman of the medal committee, J. H. Gibboney, Norfolk & Western Railroad, Roanoke, Va. The successful candidate was Dr. A. H. Pfund, professor of physics, Johns Hopkins University, Baltimore, Md. The selection is made on the basis of the best technical paper presented during the previous year—"Hiding Power Measurements in Theory and Application," —presented at the 1930 annual meeting in Atlantic City. It discusses a rigorous definition of the hiding power of paints. Graduated from the University of Wisconsin in 1901, Prof. Pfund was awarded the Science Club medal of his university. He obtained his Ph.D. degree from Johns Hopkins in 1906, later attaining his present position. In 1922 he was awarded the Longstreth Medal by the Franklin Institute, Philadelphia, bestowed for inventions of a high order.

A report of the tellers, made at the dinner, showed that the men selected by a nominating committee had been duly elected. The list will be found on another page. The new president, F. O. Clements, represents the automotive industry in the society and the retiring president, K. G. Mackenzie, as chief chemist of the Sun Oil Co., New York, the oil interests. He becomes, as past-president, a member of the executive committee. The secretary-treasurer, C. L. Warwick, was elected recently for a term of years.

### *A Symposium on Malleable Castings*

THE first of a series of symposiums on castings, through cooperation with the American Foundrymen's Association, was held this year. It was on malleable castings, at a joint meeting of the A. F. A. and the A. S. T. M., Friday afternoon, June 26.

A large attendance greeted President Mackenzie of the testing society when he introduced N. K. B. Patch, president of the A. F. A., who opened the symposium with a brief address, emphasizing the value of cooperation between two such large technical societies.

The latest information on malleable castings, gathered from data furnished by a large number of companies, is contained in a preprint of 73 pages. This represents the work of a special committee of eight men. It is divided into seven parts, supplemented by two technical papers: "An Investigation of Methods to Determine the Machinability of Malleable Iron Castings" by O. W. Boston, University of Michigan, and "Corrosion of Malleable Iron" by F. L. Wolf and L. A. Meisse, Ohio Brass Co., Mansfield, Ohio.

The first sections of the symposium — Introduction, Manufacture and Properties—were presented in abstract by W. L. Putnam, chairman of committee A-7 on malleable castings of the A. S. T. M. and president, Detroit Testing Laboratory, Detroit. H. A. Schwartz, National Malleable & Steel Castings Co., Cleveland, abstracted the fourth section, "Supplementary Data and Discussion of Tensile Properties," part of which he wrote. The sections on "Higher Strength Malleable Iron," "Cupola Malleable Iron" and the "Necessity for Cooperation Between Engineer-Designer and Foundry" were offered in condensed form by Enrique Touceda, Troy, N. Y.

Commendation of a high order was general as to the scope and success of this symposium.

### Malleable Iron Institute Meets

On Friday, June 26, the Malleable Iron Research Institute, Cleveland, held a well-attended meeting during the morning, preceding the symposium in the afternoon. It was concluded with a luncheon.

### *First Exhibition of Testing Apparatus*

AT the first exhibition of testing apparatus and machines held by the society, some 7000 sq. ft. of space was taken up by about 48 exhibitors, 33 of whom were commercial companies. The remainder were research laboratories, special Government bureaus, committees of the society, etc. Held in the exhibition hall of the hotel, it was a center of considerable interest. Only those having badges of registration were admitted. Most exhibitors expressed satisfaction with the results. The following is the official list of those exhibiting:

*Aluminum Co. Research Laboratories, New Kensington, Pa.
*A.S.T.M. committee A-8 on magnetic analysis
*A.S.T.M. committee C-5 on fire tests of materials and construction
*A.S.T.M. committee D-18 on natural building stones
Baldwin-Southwark Corpn., Philadelphia
Bausch & Lomb Optical Co., Rochester, N. Y.
Christian Becker, Inc., and The Torsion Balance Co., Chicago
*Bell Telephone Laboratories, Inc., New York

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## New Members of the Executive Committee

J. B. JOHNSON

A. W. CARPENTER

G. C. D. LENTH

K. B. COOK

O. L. MOORE

DR. A. NADAI

THE Edgar Warburg lecturer was Dr. A. Nadai, of Pittsburgh. Prof. Pfund, of Johns Hopkins University, Baltimore, was the Dudley medalist.

DR. A. H. PFUND

Brown Instrument Co., Philadelphia
*Bureau of Standards of the City of Los Angeles
Burgess-Parr Co., Chicago
Fred S. Carver, New York
*Cement Reference Laboratory, Washington
Central Scientific Co., Chicago
Consistometer Corpn., Chicago
*Cooperation Fuel Research Committee of S.A.E., A.P.I., National Automobile Chamber of Commerce and National Bureau of Standards
Gaertner Scientific Corpn., Chicago
Emil Greiner Co., New York
J. B. Hayes, Inc., Urbana, Ill.
Humboldt Mfg. Co., Chicago
Instruments Publishing Co., Pittsburgh
E. Leitz, Inc., New York
*Edgar Marburg Lecturer, Dr. A. Nadai
Morehouse Machine Co., York, Pa.
*National Bureau of Standards, Washington
Newark Wire Cloth Co., Newark, N. J.
Precision Scientific Co., Chicago
Precision Thermometer & Instrument Co., Philadelphia
Rascher & Betzold, Chicago
Riehle Bros. Testing Machine Co., Philadelphia
E. H. Sargent & Co., Chicago
Shore Instrument & Mfg. Co., Jamaica, N. Y.
Steel City Testing Laboratory, Detroit
Alfred Suter, representing the Loserhausenwerk, Duesseldorf (Germany), New York.
C. J. Tagliabue Mfg. Co., Brooklyn
Testing Machines, Inc., New York
Thompson Grinder Co., Springfield, Ohio
W. S. Tyler Co., Cleveland
*Universal Oil Products Co., Research Laboratory, Riverside, Ill.
*University of Michigan, engineering research department, Ann Arbor, Mich.
*Western Electric Co., Chicago
*Westinghouse Electric & Mfg. Co., research laboratories, East Pittsburgh, Pa.

*Non-commercial exhibitors.

Several testing machines were on display in the booth of the Bell Telephone Laboratories. One was a fatigue machine for sheet metals, designed to test simultaneously 40 specimens of varying thickness. With this machine it is possible, by varying the deflection of the reciprocating arms, to vary the intensity of the stress. Another remarkable machine was a parallel flatness and photographic recording device for measuring the flatness of telephone transmitter diaphragms.

In a special booth Dr. A. Nadai, the Edgar Marburg lecturer this year, demonstrated equipment for detecting the slip in plastic materials.

Some special equipment was exhibited in the booth of the Baldwin-Southwark Corpn., Philadelphia, used in connection with tests to measure the damping capacity of materials, illustrative of a paper at one of the sessions, "Damping Capacity of Materials" by G. S. van HeydeKampf of that company.

Special apparatus from research laboratories and Government bureaus as well as from the commercial companies were of marked interest.

## Shrinkage of Imports of Pig Iron

May imports of pig iron into the United States are reported by the Bureau of Foreign and Domestic Commerce at 10,057 gross tons. This represents a drop of about 30 per cent from the 14,479 tons imported in April, but is otherwise the heaviest month's incoming movement since that of last January. Compared with May, 1930, there was a drop of 32 per cent.

About 92 per cent of the entire import tonnage in May came from British India, against only 54 per cent from that source a year earlier. Other countries sent negligible amounts in May, none reaching 200 tons. This is in contrast with last year, when both Netherlands and Great Britain supplied upward of 2000 tons each.

In the first five months imports have totaled 46,490 tons, a drop of nearly 18 per cent from last year. More than half of the tonnage drop is represented by the much smaller movement from Great Britain. Most of the remaining decline is accounted for by smaller imports from India. Norway has almost disappeared from the picture, while Sweden has shown an increase of more than 2000 tons compared with the five months of 1930.

## Gray Iron Production Increased in May

Production of gray iron foundries increased 2.5 points during May, according to the monthly report of the Gray Iron Institute, based on returns from 155 foundries. During the first three months of the year there was a slight increase in production over each preceding month, but a slight falling off occurred in April. May rate of production was slightly in excess of that of March, having been 60.7 per cent of normal, compared with 58.2 per cent in April.

Both new business and unfilled orders fell off in May, new business having been 51.2 per cent, compared with 60.9 per cent in April, and unfilled orders were 39 per cent, compared with 43.7 per cent the previous month.

The greatest activity was shown in the district comprising Wisconsin, Illinois and the territory west of the Mississippi River, which showed a production of 72.8 per cent in May, against 57.1 per cent in April. There was a drop in the district comprising Michigan, Ohio, Indiana and the southeast of the Mississippi River to 59.3 per cent in May, against 63.2 per cent in April. New England, New York, New Jersey and Canada declined to 46.9 per cent in May from 51.9 per cent in April. The Chicago district was practically unchanged at 60.6 per cent in May, against 60.3 per cent in April.

Business outlook, as reported by 120 foundries, is approximately the same as in the preceding month. Three foundries reported the business outlook good, 42 fair, 52 poor and 23 bad.

**United States Imports of Pig Iron by Countries of Shipment**
(In Gross Tons)

| | May | | Five Months Ended May | |
|---|---|---|---|---|
| | 1931 | 1930 | 1931 | 1930 |
| United Kingdom | 160 | 2,109 | 1,345 | 6,998 |
| British India | 9,252 | 7,809 | 36,177 | 40,631 |
| Germany | 52 | .... | 52 | 50 |
| Netherlands | 187 | 3,028 | 4,895 | 5,151 |
| Canada | .... | 32 | .... | 338 |
| France | .... | .... | 25 | .... |
| Belgium | 100 | .... | 100 | .... |
| Norway | .... | 783 | 86 | 2,063 |
| Sweden | 99 | 880 | 3,077 | 1,029 |
| All others | 207 | .... | 733 | 41 |
| Total | 10,057 | 14,641 | 46,490 | 56,301 |

# Notable Symposium on Effect of Temperatures on Metals

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IN May, 1924, the American Society of Mechanical Engineers, at one of it regular meetings held in Cleveland, invited the American Society for Testing Metals to join in a symposium on the effect of temperatures on metals, particularly with reference to the power industry. This was the first broad consideration of a subject just looming as one of expanding importance.

Last week in Chicago—on Tuesday, June 23—the same societies, with the A. S. T. M. as host, joined in a second symposium on the same subject. It was an occasion which will be long remembered by those who took part and by those fortunate enough to be present. In scope and comprehensiveness this symposium was pronounced by several leading metallurgists as the most outstanding ever held in this country on that or any other subject having to do with the metal industry. Some idea of its magnitude may be gathered from the fact that 28 papers were contributed, in a preprinted volume of 620 pages. Almost every phase of the subject as it concerns the power, the oil, the chemical, the ceramic, the metallurgical and heat-treating industries was covered by the 38 authors of these papers.

Months of preparation, of course, preceded the event. The program was arranged by a joint research committee of the A. S. M. E. and the A. S. T. M., of which H. J. French, research department, International Nickel Co., New York, is chairman. Large credit is due H. W. Gillett, director, Battelle Memorial Institute, Columbus, Ohio, who managed most of the details of the papers and the discussions. The published volume was in the hands of members about two weeks previous to the meeting.

A unique plan was adopted in the presentation—two men were selected to prepare and read an abstract of the papers which were apportioned between two sessions, one held Tuesday afternoon, June 23, and the other in the evening of that date. The first session considered 11 papers, coming under the general subject of "Engineering Trends and Requirements of Metals for High and Low Temperatures," and the second session covered 17 papers, classed as embracing "Properties of Available Metals for High and Low Temperature Service," the former representing the engineers' viewpoint and the latter that of the metallurgists. The detailed program was printed in THE IRON AGE, June 4, page 1852.

The unusually difficult task of abstracting these papers, in the 30 to 40 minutes allotted each abstractor, was ably met by L. W. Spring, chief metallurgist of the Crane Co, Chicago, at the first session and by H. J. French at the second session—both recognized investigators in this field. Previous to the first session a report of the committee was presented, which included as an appendix three papers: "Progress Report on Fatigue Tests of Low-Carbon Steel at Elevated Temperatures" by Prof. H. F. Moore and N. J. Alleman, University of Illinois, Urbana, Ill.; "Apparatus for Low Temperature Endurance Testing" by H. W. Russell and W. A. Welcker, Jr., Battelle Memorial Institute; and "New Creep Testing Apparatus at the Massachusetts Institute of Technology" by F. H. Norton and J. B. Romer.

The symposium was introduced by a short address by W. L. Abbott, past president of the A. S. M. E. The presiding officers were K. G. Mackenzie, president of the A. S. T. M., and A. D. Bailey. At the evening session Dr. F. M. Becket, vice-president, Union Carbide & Carbon Co., New York, presided. The attendance for the first session, which lasted from 2 to 6 p.m., was over 500. A somewhat smaller crowd displayed keen interest at the second session, which continued from 8 p. m. until midnight.

Many written discussions of each paper were abstracted after the presentation of the general abstract and there was some oral discussion. It was generally conceded that the printed symposium, together with the unusual amount of additional data offered in the written discussions, constitute the very latest information on the subject. It is possible here to publish only a somewhat condensed portion of the abstracts by Messrs. Spring and French.

## Papers Abstracted by L. W. Spring

BEGINNING with the steam power plant, we will discuss successively steam power requirements, the steam turbine, petroleum industry problems, electric furnace resistors, supports, etc., roasting, smelting and refining industry equipment, the ceramic industry, and, lastly, corrosion and other problems in the use of metals at high temperatures in the chemical industries.

### *Requirements for Steam Piping*

F. W. MARTIN, assistant mechanical engineer, Sargent & Lundy, Inc., Chicago, who long has been associated with design and operation of steam electric power plants, has given us a paper entitled "Metallurgical Requirements for High-Temperature Steam Piping." Since the world war, due to the necessity for efficiency, pressures have gone to 600 and even 1400 or 1500 lb. per sq. in. in certain cases, whereas in Europe the critical pressure of 3200 lb. has been tried. In this country 2500 to 3000 lb. per sq. in. pressure is being definitely considered. Temperatures, during recent years, have been approximately 750 deg. F. maximum, with 825 and 850 deg. F. now coming to be used; 1000 deg. F. will be used as soon as the steel maker and metallurgist are able to supply fully satisfactory materials.

Mr. Martin refers to the present Class B seamless steel tubing with 62,000 lb. per sq. in. maximum tensile strength, the unit stress of 9000 lb. per sq. in. which is used as the basis for design under the A. S. M. E. Boiler Code, though some likely are using the higher fiber stress of 12,000 lb. per sq. in., which recently has been allowed by the A. S. M. E. Boiler Code.

#### Creep of Metals Must Be Considered

He refers to the consideration of creep of metals at the higher temperatures, stating what now has become a general conclusion, that creep at high temperatures is unavoidable and must be provided for. The actual permissible creep must be less than the minimum necessary from a safety standpoint. The working range of 2 to 3 per cent creep possibly would be permissible in most power plant applications.

While many of the joints are of the

metal to metal type, sometimes gaskets are used. These also must be made of metal. For convenience of consideration, Mr. Martin divides the full temperature range used and to be considered in the immediate future into, first, 750 to 850 deg. F.; secondly, 850 to 1000 deg. F., and, thirdly, temperatures above 1000 deg. F. He states that pipe and fittings can be allowed a total creep of 3 per cent in 200,000 hr., the latter a matter of 22.8 years—this since the power plant designer considers that a plant should give service for a period of from 15 to 25 years. Steam valves, naturally, because of very closely fitting parts, cannot be allowed this much creep.

### *Metals for the Power Plant*

H. J. KERR, in charge of the research development and service departments, the Babcock & Wilcox Co., New York, has given us a valuable paper entitled "Trends in Engineering Requirements for Metals for the Power Plant Industry." He mentions three methods being contemplated for increase in efficiency: 1. Increase in pressure of steam, 2. Increase in temperature of steam, 3. Substitution of some material other than steam as the intermediate energy conveying fluid.

Creep at 1000 deg. F. and 10,000 lb. per sq. in. stress, should not be more than 1 per cent in 100,000 hours (11.4 years). In the matter of superheater tubes, which usually have to withstand the higher temperatures of the flame and corroding exhaust gases, creep of the same order of stress should be withstood even at temperatures as high as 1300 deg. F. This higher temperature and the sulphurous and corrosive gases make the requirements for superheater tubes rather more drastic throughout. For the mercury boiler the material should be capable of operation at a temperature of 1100 deg. F. under a working stress of approximately 3000 lb. per sq. in., and should not oxidize or be affected at this temperature by gases or from mercury vapor.

Mr. Kerr, in his last paragraph, calls attention again to the fact that "to be of real value to the power industry, the materials must be obtainable at a cost which will result in a reasonable return on investment," meaning, of course, that the materials must be what we call of the "commercial" or readily obtainable and readily fabricated class.

### *Steam Turbine Materials*

THE steam turbine is a very important part of the high temperature power plant, and the subject is covered by R. C. Allen, manager, central station turbine division, Westinghouse Electric & Mfg. Co., South Philadelphia, Pa. Being complicated and a very high power and high speed mechanism, design of the turbine is very important. One of the main factors of this design is the close

L. W. SPRING

adjustment or small clearance between the moving and the stationary parts. Therefore, after stating that the operating temperatures around 850 deg. F. now are recorded as standard, with temperatures of 900 and 1000 deg. F. being planned for, Mr. Allen proceeds at once to the creep stress relationships. Since the clearance between the rotor and the case is small, and since the power plant designer insists upon a power plant which must remain operative for 15 years at least, the turbine designer designs his turbine allowing a creep rate of not over 0.01 per year.

#### Four Conditions Stipulated

Four conditions for operating pressures and temperatures for which high temperature turbine parts must be designed are given as 475 to 1400 lb. per sq. in. for initial steam pressure, and 800 to 875 deg. F. for initial temperature. It has been found in operation that for a short time temperatures can slightly exceed the rated temperatures without apparent impairment of turbine parts. For commercial purposes 25 deg. F. fluctuation is the usual limit specified and allowed.

In building sections entailing complicated constructions, such as those carrying the steam inlet passages, there has been some competition between steel castings and built-up-by-welding assemblies. Mr. Allen suggests that in actual cylinders of the two types comparative studies indicate that the casting is somewhat more reliable and cheaper.

#### Alloy Steel Bolting Used

With the large size port openings necessary in the present day equipment high quality alloy steel bolting should be used. Bolts often are of such large size that it is difficult with wrenches to draw the nuts up tight enough to insure tight joints. Copper plating of the threads and the use of case-hardened washers is advisable to avoid abrasion in drawing up the nuts, and sledging of the wrench handles should be avoided. The most desirable method for drawing up large sized bolts is to heat them electrically by an immersion heater in a hole drilled along the axis of the bolt and to draw up the nuts while the bolt is hot so that shrinkage upon cooling automatically will tighten it.

Higher strength bolt steels, higher grade cast and welding steels are desired. Mr. Allen thinks that the present spindle and turbine blading materials will serve at least for the present limits of 850 deg. F.

### *A French Contribution*

PIERRE CHEVENARD, civil engineer of mines, professor at the Ecole Nationale Supérieure des Mines de Saint-Etionne, chief of the department of scientific research of the Société Anonyme de Commentry-Fourchambault et Decazeville, sent a paper on "Mechanical Properties of Metals at Elevated Temperatures."

At the experimental laboratory of the Société at the Imphy Steel Works, much study has been given to the effect of elevated temperatures on the elastic properties of metals. A torsion pendulum has been successfully used, made by suspending light wires of various metals in a constant temperature furnace in determining internal friction of metals as a function of the decrement of oscillations.

The engineer must utilize materials before the metallurgist or physicist has discovered all facts concerning them, says the author. He must adopt for his calculations first approximations and for the time being at least will disregard lesser and more or less negligible data. However in doing this he must confine himself rather narrowly to the region in which the definite tests have been made. While empirical and comparative tests give fairly satisfactory solutions of the problems of heat resistant alloys, they allow us chiefly to compare the products with each other, though the results may not be accurate as actual values. The engineer, knowing this, uses a liberal factor of safety.

### *British Progress and Trends*

FOUR of our friends in England, led by R. W. Bailey, research engineer, Metropolitan-Vickers, Ltd., Manchester, and J. H. S. Dickenson, chief metallurgist, English Steel Corpn., Sheffield, gave a paper on the trend of progress in Great Britain.

They recall the fact that it is still necessary to determine for each temperature the relationship between the applied stress and the rate of creep, and from the curve drawn other stresses and approximate rates of creep may be extrapolated. The designer of an apparatus must determine, according to the nature of his design, the allowable rate of creep. Not only must the rate of creep be known, but it is necessary that the physical condition of the steel remain the same during and after the period

of service, that is, the steel must be a stable alloy. It is known that changes occur in some materials even at reasonably low temperature whereby the steel may lose toughness and become embrittled. Research is being made into these phenomena and steels are being developed which will remain stable.

In Great Britain, as in the United States, considerable thought was given during the past few years to developing some sort of "accelerated" creep test. The time-yield method introduced by Hatfield and the method devised by Barr and Bardgett, the latter depending upon the accurate measurement of diminishing rate of creep, are mentioned. It is stated that these, of course, are still on trial. Meanwhile the long time tests are being run and are considered necessary.

**Special Alloy Steels Recommended**

Several alloys are mentioned with the upper temperature limit which in general they place upon them. The 3 per cent nickel, 1 per cent chromium steel is considered little, if any, superior to a good mild steel, the creep limit allowing them to be used not higher than 400 or 500 deg. C. (750 to 930 deg. F.). Nickel does not seem to the authors to be of any value in improving the load carrying ability.

Of the low alloy content steels, chrome-vanadium steel of 1 per cent chromium and 0.25 per cent vanadium has been found to be quite satisfactory up to 400 deg. C. (750 deg. F.), but in strength, this chrome-vanadium steel drops off quite rapidly beyond this temperature.

Steel containing 2.5 per cent nickel, 7 per cent chromium, 0.30 per cent molybdenum has excellent properties up to 500 deg. C. (930 deg. F.), but with stress of 3000 lb. per sq. in. and 550 deg. C. (1020 deg. F.) creep becomes quite rapid. It is definitely proved that the addition of molybdenum without nickel or chromium very greatly improves the strength of steel at high temperatures. For this reason carbon-molybdenum steel of 0.30 to 0.40 molybdenum and 0.10 to 0.20 carbon has been well investigated. Such can be manufactured readily, can be welded and has high creep properties at temperatures up to 550 deg. C. (1020 deg. F.). The authors predict its extended use for steam power plant and chemical use.

Increase of chromium content seems to improve creep properties and the steel containing 8 per cent chromium and 3 per cent silicon can be used with good creep resistance up to 500 deg. C. (930 deg. F.). However, there are said to be difficulties in manufacturing this steel. The martensitic stainless steels of 12 per cent chromium possess good creep strengths and considerable resistance to oxidation at high temperatures. With carbon below 0.10 per cent ("stainless iron"), it can be cold worked readily and may be used for superheater tubes, but this material is open to the objection of grain growth upon welding.

**Rustless Steels Increasingly Used**

The austenitic stainless steels are being increasingly used for high-temperature service. These resist oxidation well up to 900 deg. C. (1650 deg. F.) and have good creep properties up to 600 deg. C. (1110 deg. F.). They are weldable and can be produced in almost any form by special technique. An objection is the brittleness which may occur during long heating between 500 and 850 deg. C. (930-1650 deg. F.) and the likelihood of intercrystalline fissuring or decomposition in certain corroding media after such heating. Addition of tungsten improves those steels as also does restricting the carbon to low percentage content.

The paper discusses exhaust valves for automobiles. High speed, tungsten-type steels, silicon chromium, cobalt chromium and other steels have been tried, but there seems to be a well-defined tendency in Great Britain to adopt the austenitic nickel-chromium steels.

Mild steel can be used up to approximately 930 deg. F. without excessive scaling while the expensive heat-resistant materials will serve as high as 1830 deg. F. There has arisen a demand for a medium priced steel which will give good service. Such a steel is one containing about 7½ per cent chromium up to 1 per cent silicon, usually with less than 0.12 per cent carbon. This can be fabricated readily, can be drawn into tubes, and serves well up to 700 deg. C. (1290 deg. F.), above which the more expensive heat-resistant steels must be used.

For pipe balls for Pilger mills and extruding presses either tungsten or molybdenum are used and it is coming to be felt that such high-grade steels, properly heat treated and drawn at a temperature higher than the temperature the parts will attain in service, are more economical in the end than parts and equipment of lower grades of steel which cost less but have to be replaced much oftener.

### *Needs of the Oil Industry*

THE petroleum industry has helped itself, through its well-known organization, the American Petroleum Institute.

E. S. Dixon, metallurgist, Texas Co., Port Arthur, Texas, sent out a questionnaire to approximately 200 refineries and to 20 manufacturers of refining equipment. In some cases corrosion transcends in importance the high temperature problem.

### *In the Ferrous Metal Industries*

J. C. WOODSON, Westinghouse Electric & Mfg. Co., Mansfield, Ohio, says, for furnace resistor elements, only three malleable alloys are in most general use at the present time. These are 80 per cent nickel 20 per cent chrome which has proved to be the most satisfactory; the 60 per cent nickel, 16 per cent chrome, 23 per cent iron which is next best; and the 34 per cent nickel, 20 per cent chrome, 42 per cent iron. In relative length of life these are in ratio of about 7½, 3 and 1. They are procurable in rod, strap, ribbon and wire. The first can be used up to about 1950 deg. F. and the other two are for lesser temperatures. In the cast resistor class two types are in extensive use, the 68 per cent nickel, 20 per cent chrome; and the 38 per cent nickel, 20 per cent chrome, the latter being used for the lower temperature purposes.

Mr. Woodson states that the problems of expansion, of creep and distortion under temperature apply here also. He calls attention to the need for resistor elements which will be capable of withstanding service at temperatures up to 2000 and 2500 deg. F. so that furnaces can be constructed which will stand up under the heating of steel for forging and for high-speed steel hardening, as well as those for ceramic firing.

Heat-treating furnaces are constructed for hardening, drawing, tempering and for nitriding steels. These operate at temperatures ranging from 700 deg. F. to as high as 1900 or even 2500 deg. F., the latter too high for metallic resistor elements.

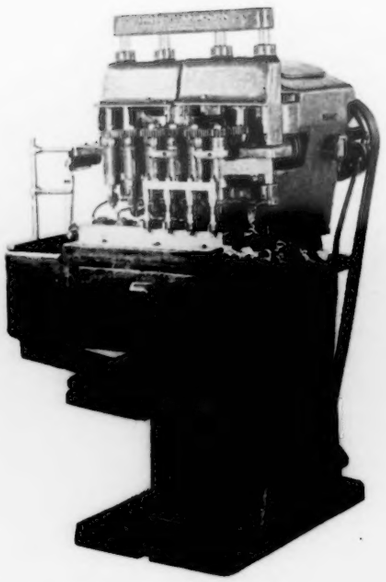
### *In the Automotive Field*

"ENGINEERING Requirements in the Automotive Industry for Metals Operating at High Temperatures" is discussed by A. L. Boegehold, metallurgist, research laboratories, General Motors Corpn., Detroit, and J. B. Johnson, chief, materiel section, materiel division, Air Corps, U. S. A., Wright Field, Dayton, Ohio. The authors analyze the automobile and the Diesel engine, giving the temperatures at which the piston intake and exhaust valves operate, and give a general picture of the work done by each part of the equipment with necessary qualifications. Mainly two piston alloys are used in the automobile engine, the aluminum alloy piston which is subjected to temperatures of from 400 to 700 deg. F. and cast-iron pistons which operate at temperatures from 800 to 900 deg. F. The cast-iron piston is the cheaper, has lower coefficient of expansion, while the aluminum piston with its much greater lightness carries higher cost, is less resistant to wear and, because of the high thermal expansion of aluminum, must be constructed with an invar strut in order not to bind in the cylinder.

They mention the aluminum alloy containing 14 per cent silicon, 2 per cent nickel, 1 per cent magnesium, 0.75 per cent copper, which does have lower expansion coefficient and state that, when beryllium costs sufficiently less than at present, its alloy with aluminum should prove to be an ideal piston alloy.

*(Abstracts by Mr. French to be published next week)*

# Combined Drilling and Tapping Machine with Conveyor Table



SMALL parts of various sizes and shapes can be handled without extensive changing of the fixtures by a combined drilling and tapping machine equipped with a conveyor-feed table, both machine and table being new products of the Globe Tapping Machine Co., 751 Central Avenue, Bridgeport, Conn.

The unit shown in the illustration at right is equipped to drill four holes ¼ in. deep with No. 36 size drills and to tap two holes with No. 6 x 32 taps. These operations are performed on small die castings at the rate of 30 a minute.

The parts are loaded on to small fixtures attached to the conveyor links. When the conveyor is indexed, the fixtures turn the parts through an angle of 90 deg. or less so that holes can be drilled and tapped at any angle. This is accomplished by sprockets on the fixture shafts that turn against stationary pins set in the table.

A spring plunger stops the fixture at the required angle. Guide bushings for the drills are arranged to clamp the work during the drilling operation. Ejection of the completed work is automatic.

Drilling and tapping operations take place simultaneously on successive pieces of work; there are separate slides for the drilling and tapping spindles, thus permitting a maximum time for drilling during each cycle. One part is completed at each stroke of the machine. The cam feed employed for the drill-spindle slide provides a long lead and a quick return; it is independent of the slide for the tapping spindles. All spindles are adjustable and positively driven through spur gears.

The conveyor feed table, which may be installed on other drilling or tapping machines, is provided with adjustable rails that permit the same fixtures to be used for different types of work within a limited range. The straight motion feed will accommodate small pieces up to 6 in. wide and 14 in. long. It is pointed out that as the parts are moved by the machine, the spindles can be set as required and holes can be drilled and tapped as close together as can be done on a single-spindle machine.

tability, being mounted on castors, the legs are extended to permit them to be wedged against the floor if desired.

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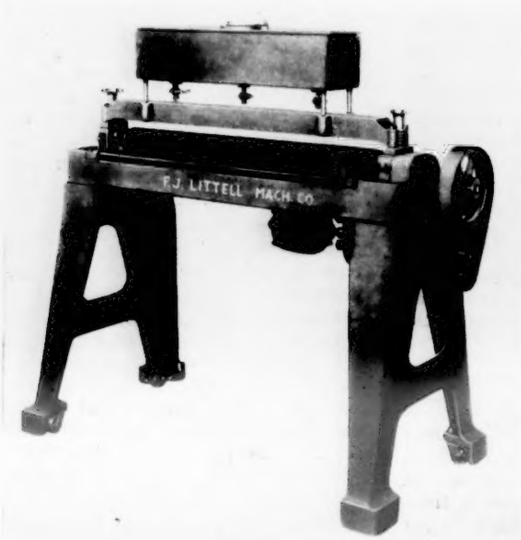
## Power-Operated Sheet Oiling Machine

A NEW power oiler brought out by the F. J. Littell Machine Co., 4125 Ravenswood Avenue, Chicago, will handle No. 12 gage and lighter sheets up to 36 in. wide at the rate of 100 ft. per min. Stock drawn between the power-driven rolls receives a thorough application of oil; excess oil is removed by a wiping device.

The oiling rolls are made up of felt washers 1 in. wide and may easily be removed to renew the felt. The drive is by a ½-hp. motor through reducing gears, the motor taking current from any convenient light socket. An automatic switch is provided to stop the motor in case of overload. Although the machine is designed for easy por-




THE capacity is for sheets up to No. 12 gage, 36-in. wide. The machine is portable and takes current from a light socket. The sheets are fed at the speed of 100 ft. per min.

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## Decorative Black Finish for Cadmium Plating

A NEW finish, known as Udyblack and said to be especially suitable for application to cast and sand-blasted surfaces and ornamental ironwork, has been announced by the Udylite Process Co., 3220 Bellevue Avenue, Detroit, licensor of the Udylite process of cadmium plating. Either a jet black or a steel-gray finish can be obtained to contrast with bright cadmium plating. The finish appears as a black powder that may be wiped off, leaving a thin steel-gray surface that adheres closely to the Udylite coating. The dark finish is said to retain the corrosion-resistant properties of cadmium plate.

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Welding rod was straightened and cut to length at high speed by a machine of the Lewis Machine Co., Cleveland, exhibited in connection with the meeting of the Association of Iron and Steel Electrical Engineers at Cleveland. Welding rod of ⅜ in. diameter was uncoiled, run through the straightening machine and cut into 14 in. lengths at the rate of 106 pieces a minute. A description of the machine appeared in these columns on page 1991 in the issue of June 18. A feature was the welding together of the ends of the coils, an arrangement which eliminated waste of wire.

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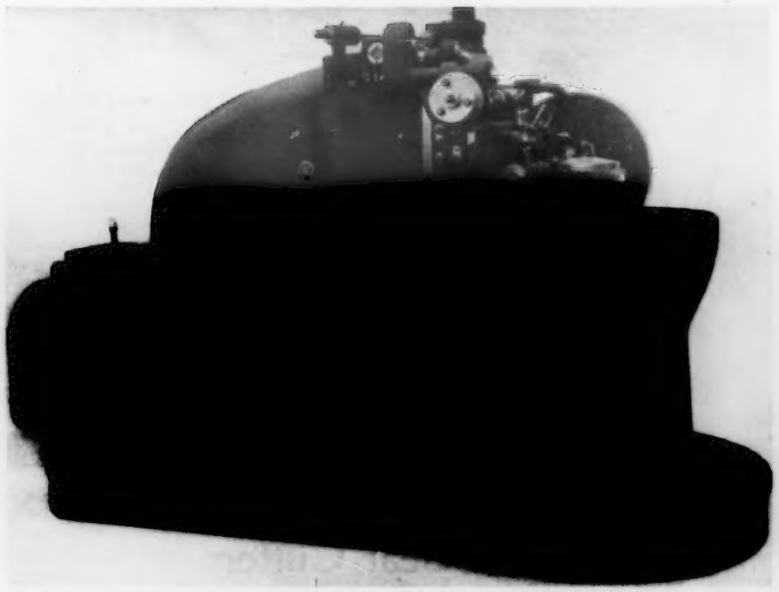
Fusion Welding Corpn., Chicago, has appointed the Puritan Compressed Gas Corpn., Kansas City, Mo., as distributer for Weldite welding rods in Kansas and western Missouri.

# High Production Wormwheel Hobber Has Interlocking Feeds



THREE methods of feeding the cutter into the work may be employed in operating the "Pfauter" Model S.R. high production wormwheel hobbing machine recently placed on the American market by O. Zernickow Co., 15 Park Row, New York. These three methods are: (1) radial feed of the tool toward the gear; (2) axial feed of the tool toward the gear, and (3) a combination of radial feed for roughing and axial feed for finishing. An indexing and setting device is provided so that fly cutters as well as hobs can be used when the radial type of feeding is employed.

The main drive is through a single pulley belted to a line shaft or by an electric motor through belt or gearing. A friction clutch is built into the main pulley or driving gear. Power is transmitted by spur and bevel gears to a large internal gear and flywheel mounted on the cutter spindle. This flywheel gear and a second flywheel on the fast-running vertical shaft assure smooth operation. Pick-off gears are provided for changing the cutter speed.

The slide carrying the hobbing head can be adjusted vertically along the wide flat guides of the upright to set the cutter axis with the center of the wormwheel. The hob spindle sleeve is mounted on a swivel base that allows the cutter axis to be swiveled a few degrees each side of zero by means of a worm drive and set to the desired angle by a vernier scale. The small overhang of the cutter spindle from the guides of the hobbing head and upright further improves the smoothness of running.

Axial movement of the cutter is obtained through a slide mounted on the swivel base carrying the cutter spindle. Radial feed of the hob or cutter toward the work is effected by moving the machine upright together with the whole hobbing saddle on the long and wide dovetailed guides of the bed. Adjustment of the ways is possible by means of wedge-shaped strips. The hobbing head on the upright as well as the hob slide on its swivel base, can be locked to relieve those ways that are not required when working.

The index drive is designed for small ratios between the cutter spindle and the work spindle when small numbers of teeth and multiple-start worms are encountered. The minimum ratio of the number of teeth in the gear to the number of starts in the worm is 4.

The dividing gear is mounted on the underside of the work table in such a way that its guides are adjustable in both directions. The worm is hardened and ground all over and can be adjusted both radially and axially. It runs in bronze bearings and the axial thrust is taken by ball races. The work is mounted on a vertical arbor and is located low down on the work table, which is provided with T-slots.

The radial and axial feeds of the hob are independent and are interlocked so that it is impossible to engage both together or one quick-travel with one feed movement, or to engage the differential at the wrong time. At the limit position of the saddles, the feed and quick-travel movements disengage automatically. A vernier scale can be set to provide automatic disengagement of the feeds at any point; provision is made for stopping the cutter drive at the same time.

Lubricant pump and coolant pumps are furnished. Specifications include: maximum diameter of wormwheel, 19¾ in.; maximum pitch, 1½ C.P.; diameter of work table, 15¾ in.; hob speeds, 52 to 154 r.p.m.; power required, 7½ hp.; approximate weight, 10,000 lb.

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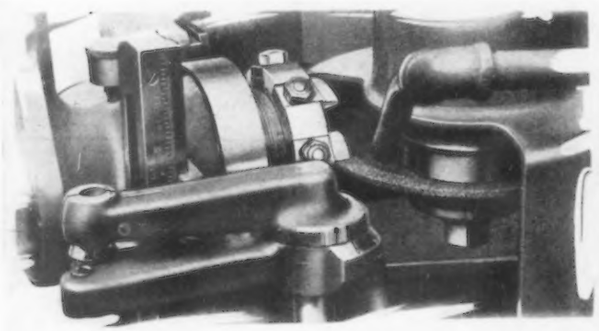
## *Portable Grinder and Buffer Operates at 5400 R.P.M.*

THE portable grinder and buffer illustrated, recently brought out by the Standard Electrical Tool Co., Cincinnati, operates at a spindle speed of 5400 r.p.m. High-speed Carborundum Redmanol 6 x 1-in. wheels are used.

The machine is equipped with a ½-hp. General Electric "Hy-Frequency" motor for operation on a 220-volt, 180-cycle, three-phase current. The SKF ball bearings are mounted in dust-proof chambers and run in oil. Control is by a switch of the trigger type. Electrical connection is by a four-wire cable, one wire being used for a ground. The length of the grinder is 26 in. overall, and the diameter is 4½ in. The machine weighs 20½ lb.



THE arrangement of the cutter with relation to the grinding wheel is shown at left. Being a special-purpose machine, the design is simple.

# Sharpener for Small Spiral Bevel Gear Cutters

FOR sharpening the circular cutters of small Gleason spiral bevel gear generators, the Gleason Works, Rochester, N. Y., has brought out the grinding machine illustrated. Both right and left-hand cutters, of 6-in. diameter or less and with all inside, all outside, or both inside and outside cutting blades, may be sharpened.

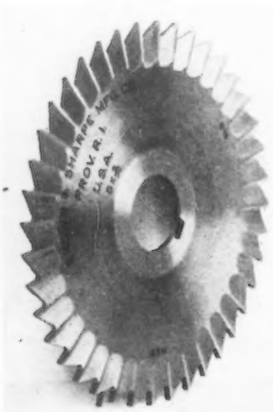
The adjustable cutter spindle is carried on a swinging head so arranged that the cutting edges may be moved across the face of the standard 8-in. dish-shaped grinding wheel mounted on a ball-bearing spindle. Convenient hand-nuts permit proper setting of the cutters for any desired cutting angle, and a stop screw keeps the cutter from moving too far into the wheel. The index mechanism, of notched plate type, is hand operated.

For dressing the grinding wheel to the correct angle, there is a diamond holder arranged to swing across the face of the wheel. A fine adjustment permits the wheel to be dressed by removing a minimum amount of stock. A constant stream of coolant is supplied at the point of contact between the work and the grinding wheel. Lubrication of the wheel spindle bearings is provided by a main oil cup. The driving motor is a 1-hp., 1800 or 1500-r.p.m. unit. The machine weighs 1500 lb.; floor space required is 31 x 39 in.

## Metal Saws with Side Chip Clearance

TWENTY-ONE sizes of metal slitting saws with side clearance providing large chip space is being announced by the Brown & Sharpe Mfg. Co., Providence, R. I. In addition to the pockets at the sides of the teeth, the sides of the saws are recessed and there also is concavity on the lateral cutting edges. This design is intended to reduce rubbing and dragging with attendant heating and jamming, thus permitting deep slots to be made at one cut.

The new saws are made of high speed steel and may be obtained in diameters from 3 to 8 in. and in a suitable range of thickness. Saws with teeth 5/32-in. thick or less have conventional straight tooth form as illustrated; those of 3/16-in. thickness are of the staggered-tooth type.



## Rolled Steel Gear Blanks of Welded Construction

ARC-WELDED steel gear blanks are manufactured by Lukenweld, Inc., division of the Lukens Steel Co., Coatesville, Pa., in a wide variety of sizes from 24-in. outside diameter up, for spur, herringbone and helical gears. The largest all-welded gear blank yet made by the company weighs 4350 lb. It is of 66¾-in. outside diameter, 11¾-in. width of face, 4⅛-in. rim thickness and 22½-in. hub diameter.

The hubs are cut by the torch process from solid rolled steel the thickness of which is determined by the hub diameter. Webs and ribs are similarly cut from rolled steel plate, the ribs being subsequently formed into channels of the required section. In assembling the blanks, the webs are arc-welded to the hubs and the reinforcing channels welded to the web structures. After the gear rings are bent to the required diameter they are welded in position, completing the assembly. Then the blanks are thoroughly annealed under pyrometric furnace control.

In making the blanks, no patterns are required, a feature emphasized as permitting rapid production of blanks of any size. Major advantages claimed include homogeneity of the rolled stock, assuring sound structure of the teeth when cut.

# New Machine Drills and Taps Work Submerged in Coolant

TWENTY-ONE holes up to ¼ in. in diameter may be drilled or tapped at one time on a semi-automatic adjustable multiple-spindle machine recently designed by the Krueger division of the Ex-Cell-O Aircraft & Tool Corpn., Detroit. A feature of the machine is the manner in which the work is submerged in coolant during the machining operation.

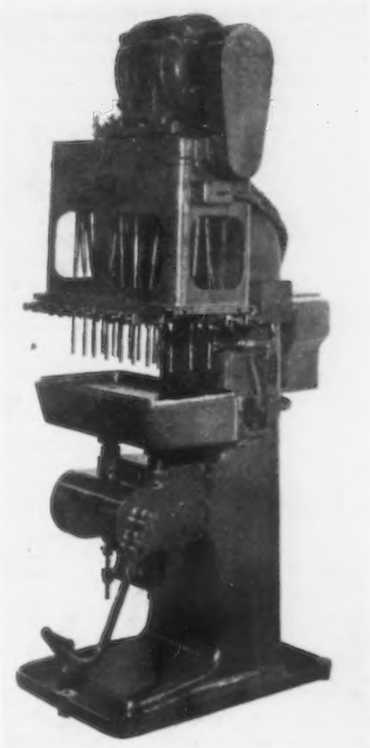
Work is held by suitable fixtures on a table that is raised to meet the drills or taps. The table proper is mounted on two plungers within a tank or container filled with cutting compound, the whole assembly being so designed that when the foot pedal is depressed the center work table remains stationary for the first part of the stroke. At the same time the outer or tank portion moves upward, causing the coolant to flood the work, in which position the drilling or tapping operation is performed. When the foot pedal is released, the center table with the work again emerges from the cutting fluid and the operator is able to unload and reload above the level of the fluid. The work table is counterbalanced.

The outer or tank part of the table assembly is mounted on hollow rack guide bars through which extend the two plungers supporting the work table. At the bottom of these plungers are two adjustable set screws that limit the downward movement of the work table while the tank section continues to recede.

The multiple spindles are fully adjustable and, when designed for tapping, are threaded through their support arms to the correct lead for each individual tap. By this arrangement the taps are fed into the work correctly, eliminating the possibility of cutting away or stripping the first few threads of the hole being tapped. A reversible motor is provided with the machine when it is used for tapping.

The spindle drives are of standard universal joint design. Instead of a spur gear drive assembly, three cluster gears, driving through worm gears, operate each group of spindles in the upper portion of the head. A Texrope drive from the motor to the worm shaft is intended to provide quiet operation and to eliminate shock when the motor is reversed during the tapping operation.

The cycle of operations begins with the depression of the foot pedal by the operator. The upward movement of the table operates a limit switch that starts the motor in a forward rotation. The table is raised to a positive stop and held there by the operator while the spindles feed into the work to a predetermined depth, then the motor is automatically reversed. Upon reaching the original or neutral position the motor is automatically stopped. This particular cycle is employed only for tapping; for drilling operations the pedal is used for feeding and the motor continues to run in one direction only.



Twenty-one spindles for drilling or tapping ¼-in. or smaller holes are provided.

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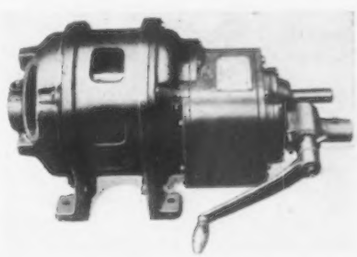
# Combination Multi-Speed Drive and Motor

A MULTI-SPEED reduction gear unit built in combination with a standard a.c. motor has been developed by the Westinghouse Electric & Mfg. Co., East Pittsburgh. Constructed to give four different speeds to the output shaft at constant horsepower, this unit, designated as the Westinghouse-Wise multi-speed drive, is applicable to those many industrial operations which, for highly efficient performance, require drives providing more than one speed.

With this drive the speed of the driven apparatus may be changed instantly while the motor is running at full speed and under full load. All gears are constantly in mesh, and in no way can the operator injure the unit by changing speeds at any time.

This gear unit is mounted on a standard squirrel-cage induction motor. In the gear unit, a pinion mounted on the motor shaft drives a gear mounted on the countershaft. Also on the countershaft are four idling ring gears which are constantly in mesh with four gears that are pressed on the output shaft. Each countershaft gear is provided with an internal clutch which is made to fit the bore of the gear. The clutch is actuated by two tapered wedges which are forced between the clutch halves by a spring member.

To bring this member to the correct position for a desired speed, the control handle, which is provided with a spur pinion, is rotated, actuating a rack which is mounted on the spring member. This movement brings the spring member between the tapered wedges, thereby providing the pressure for clutching any one of the four ring gears to the countershaft, which in turn drives the output shaft at the desired speed.



Compactness features the combination of multi-speed drive with its actuating motor.

Between each speed and the next is a neutral position. To disengage the clutch and bring it into a neutral position, it is only necessary to rotate the handle to draw the spring member into a position which does not contact the expanding wedges. A further movement of the handle brings the spring member into contact with the next set of expanding wedges, and clutches the next gear to the countershaft. Therefore, it is not only possible to make speed changes under full load, but the apparatus can be stopped or started under that condition.

Ball bearings are used in both motor and gear unit, assuring high starting efficiency and unvarying alinement of shafts. The gearing in the first reduction, or drive from the motor to the countershaft, is of the single-helical type, insuring quietness of operation. The other gears on the countershaft and those on the output

shaft are of the spur type. All gearing is accurately machined from high-quality forged steel, and given treatment to insure highest wear-resisting and load-carrying characteristics.

A simple but positive splash system is provided for lubricating both gearing and bearings. Oil is picked up by the gear teeth in the lower part of the case and delivered to mating gears and all other moving parts. An oil gage is provided for checking the oil level. Because the motor and gear drive are built as one unit, installation is simplified, less space is required, and only one mounting bracket or foundation is needed.

Multi-speed industrial drives are particularly adaptable to machines on which pieces of both large and small diameters are turned. When the quantity of material to be delivered by a conveyor varies, the conveyor drive should be variable in speed.

Use of heat-treated gearing throughout and the reduction of the number of moving parts to the minimum effect a very appreciable saving in operating cost, as practically the only maintenance required is the replenishing of the lubricant at regular intervals. The unit is offered in three sizes, ranging in rating from ½ to 7½ hp. The four speeds available in the gear drive itself, plus the availability of motors giving different driving speeds, make it possible to obtain a wide range of speeds.

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# Instrument Measures and Controls Heating Effect of Gases

By A. E. KROGH

Development engineer, Brown Instrument Co., Philadelphia.

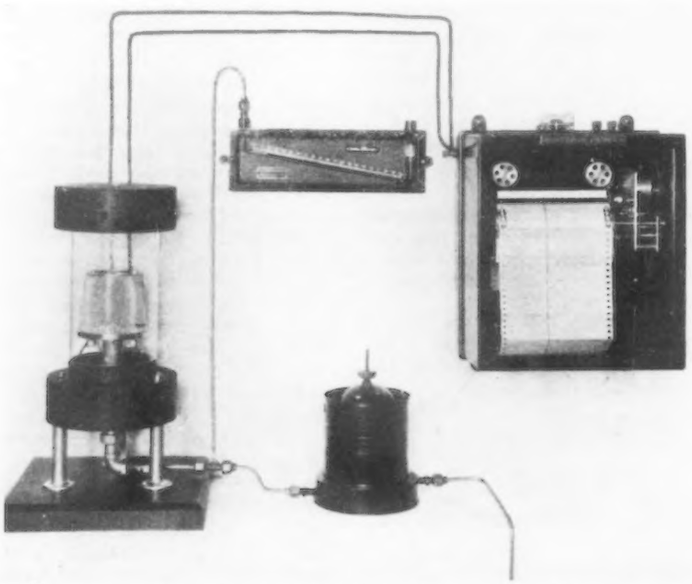
A WIDELY useful instrument for checking the heating effect of fuel gas has been developed by the Brown Instrument Co., Philadelphia. Called the Brown flame analyzer, the new instrument can be supplied to measure, record and automatically control the heating effect of any gas. By its aid industrial plants using producer gas are enabled to check and regulate the quality of their gas output with special reference to heating effect.

In the many cases where it is necessary to dilute a rich gas, or enrich a lean gas, the flame analyzer equipment not only makes it easy to observe and record the quality of the output, but makes possible a dependable automatic control of the mixture that will insure a uniform product. The value of such a device is self-evident in numerous industries where gas fuel is largely employed.

However, in many industrial processes the Brown gas analyzer, particularly in its automatic control type, can materially aid production. There are a great number of cases in industry where the heating effectiveness of gas fuel is vital, particularly in manufacturing processes where great sensitivity to changes in the rate of heat propagation is a factor.

All lamp factories must contend with the problem of maintaining a very large number of small gas flames at uniform temperatures. These flames are used in sealing the glass bulbs. If the effective temperature of the flames suddenly changes the work will be damaged. The Brown flame analyzer, put into such a factory and connected to the necessary control equipment, will maintain a uniform pilot flame in the analyzer, which in turn will result in unvarying flames throughout the plant.

The accompanying illustration shows the Brown flame analyzer, together with recording instrument, pressure governor and gage controlling flow of gas through the analyzer.



Flame analyzer with recorder (at right) and suitable pressure regulating equipment.

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# Tool Grinder Made of Welded Steel

A TOOL grinder of all-welded steel construction, permitting a material saving in weight, has been announced by Forbes & Myers, 172 Union Street, Worcester, Mass.

Marked savings in weight are made possible by the welded steel construction.

Two 1 x 10-in. grinding wheels are mounted on the shaft of a ¾-hp., 1800-r.p.m. induction motor. Both wheels have permanent guards and the left-hand wheel is provided with a tool rest, adjustable in two directions. The guard of the right-hand wheel has a larger opening that will admit work which cannot be ground on a tool rest. The ball bearings are of the grease-seal type packed with sufficient lubricant for a year of ordinary use.

The motor is inclosed from the outside air and is cooled by air circulating through the stand. It is controlled by a switch mounted in the base. Knockouts are provided at several convenient points so that lead wires to the switch can be brought out in any direction.

# NEWS
# A RAPID SURVEY OF THE WEEK'S EVENTS

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## NEW ENGLAND

FIRST National Bank of Boston reports that industrial activity in New England is only 15 per cent below normal, compared with 25 per cent for the country as a whole. A sharp upturn in the woolen goods and shoe industries has been partly responsible for this gain. Not altogether, however, for H. J. Klingler, vice-president and general sales manager of Chevrolet, reports that "the brightest spot in the country is the area along the North Atlantic Seaboard. We are doing more business there than we ever did before."

New England was the first to feel the effects of the stock market slump and it also appears to be leading the recovery.

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## PIG AND ORE IMPORTS

THE Bureau of Foreign and Domestic Commerce reports an increase of 20 per cent in the iron ore imported into the United States during May over April. For the first time in history, Russia furnished a larger percentage of the imported tonnage than did any other country.

Pig iron imports, according to the same authority, dropped 30 per cent in May from April.

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## MORE CASTINGS

GRAY Iron Institute reports an increase of 2.5 points in the production of gray iron castings, this being the fourth month of 1931 to show a gain. But both new business and unfilled orders fell off in May.

## INDIAN PIG IRON

PRESIDENT HOOVER has approved the Tariff Commission's recommendation to make no change at this time in the duty of $1.12½ a ton on iron in pigs. India is the chief foreign supplier of imported pig iron, having supplied some 50 per cent of the total imports in 1926.

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## LABOR TROUBLES

WITH the exception of 1928, there were less strikes in 1930 than during any other year since 1916. Also the number of workers involved in such controversies was the lowest of any on record. According to the United States Bureau of Labor Statistics, there were but 653 disputes in 1930 against 903 in 1929 and 4450 in 1907.

The average strike in 1930 lasted 18 days, compared with an average duration of 20 days in 1929 and 51 days in 1921. Over 90 per cent of the men involved in labor disputes during 1930 were in the coal mining, the clothing, building and textile industries.

## Also in This Issue


Debt Plan Fails to Stimulate British Steel
Better Advertising Means More Business
Soviet Buying German and Polish Steel
Large Machine Tool Order Placed
Steel Barrel Output Up
Curtailment of Automobile Output Expected in July
Twenty-eighth Meeting of British Foundrymen
Annual Meeting of Testing Society


## MORTALITY

OF interest as emphasizing the wisdom of the proposed German war debt moratorium is the record of bankruptcies and liquidations in that country. Since 1926, 25,000 German companies have gone out of business. During the past four months the net loss has been 2500 companies.

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## SENSITIVE

THE consumer buying of automobiles reacts very quickly to changes in public sentiment. During the continued recession of stock market prices some weeks ago automobile buying tapered off noticeably. Since the announcement of the Hoover debt plan there has been a definite improvement in consumer buying of motor cars. This has been too recent, however, to make itself felt in production rates and, while it may mitigate the normal midsummer decline, it cannot be expected to offset it.

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## OPPOSITION

THE number of protests that are being received by the Interstate Commerce Commission in connection with the proposal for a general 15 per cent advance in freight rates makes it appear probable that action by the commission will be delayed. The volume of protests has now reached large proportions covering a wide range of products, both agricultural and industrial.

# Tariff Commission Denies Plea for Higher Duty on Pig Iron

## President Hoover Approves Findings and Levy Will Remain at $1.12½ a Ton

WASHINGTON, June 30.—Approval by the President last Wednesday of the findings of the Tariff Commission that "no change should be made at this time in the duty of $1.12½ a ton on iron in pigs" brings to an end for the present at least efforts of merchant blast furnace interests, especially those along the Atlantic Seaboard, to get the duty increased by 50 per cent under the flexible provision.

The recommendation of the commission for no change "at this time," however, carried the implication that an advance might be found justified at a future period. The investigation was based on a resolution introduced by Senator Reed of Pennsylvania and passed exactly one year ago today, 13 days after passage of the Hawley-Smoot Tariff Act.

### This Was Second Inquiry

It was the second inquiry made by the commission as to pig iron and in both instances India was found to be the chief competing country. Unlike the former inquiry, however, the one which was the object of the report of last week covered a period when imports of pig iron were relatively small, as they are at present. The commission selected the 18-month period from Jan. 1, 1929, to June 30, 1930, when less than 100,000 tons of iron was imported from India as against production of about 1,200,000 tons by Eastern and Buffalo furnaces.

The first investigation, made on complaint of Eastern merchant furnaces, began in April, 1926, and lasted almost two years. As the result of this investigation, President Coolidge proclaimed an increase of 50 per cent in the then existing duty of 75c., raising it to the present rate of $1.12½. The original inquiry showed that the cost of production of foundry and malleable iron by Eastern merchant furnaces, delivered at Philadelphia, was $26.42, against $20.01 for Indian iron, delivered at Philadelphia, a difference of $6.41. At that time the commission indicated that the domestic industry was entitled to a greater increase than 37.5c. a ton, though under the law this was the maximum increase allowable.

In the latest report, cost data obtained covered only foundry iron, the most important grade sold by merchant furnaces, both in domestic and import trade. Areas in the United States embraced in the inquiry were the Eastern, the Buffalo, Midwestern and Alabama districts.

### India Is Largest Supplier

Since 1926, India has supplied about 50 per cent of the total imports of pig iron, and incoming shipments enter principally at North Atlantic ports. According to the commission, they rarely are shipped over 150 miles inland from the port of entry.

"Importations are apparently limited by the commercial considerations of the availability of transportation facilities at low rates, the demand in the United States market for the types of iron usually imported, and the heavy cost in relation to total value of inland transportation in the United States," says a statement issued by the commission.

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## Say Higher Freight Rates Will Stimulate Business

Higher freight rates in line with the recent request by the railroads before the Interstate Commerce Commission would stimulate general business and help in its recovery, Allard Smith, executive vice-president, Union Trust Co., Cleveland, declared in an address before the Akron Real Estate Board.

"Practically all of the increase in railroad revenue, if this rate revision is granted, will be passed on into business in general in the form of equipment buying and in greater employment on the roads and in factories," said the banker.

"Outside of carrying charges and taxes, the chief expenditures of the roads are for equipment and labor. They have no authority to reduce wage rates, but they can stop buying equipment, and they have stopped buying equipment to such an extent that the falling off in railroad demand has contributed in no small extent to the business depression."

Mr. Smith predicted a revival of home building, because of the fact that costs of building have dropped to the lowest level of the last 14 years.

A similar comment on the prospective advance in freight rates is made by W. H. Woodin, president, American Car & Foundry Co., in his annual report to stockholders, as follows:

"The general acquiescence in the request of the railroads of our country for an increase in freight rates and the announced intention of the Interstate Commerce Commission to expedite its decision of the question are of hopeful significance. That this request will be opposed by some industries goes without saying, but it is to be hoped that the purely selfish interests of a few will not be allowed to overbear the great and real necessity of the roads for such increase of revenue as will not only restore and sustain public confidence in the value of their securities, but also will permit the substitution of needed modern facilities of transportation, both rolling stock and motive power, for much equipment now in use and the purchase of the additional equipment that undoubtedly will be required upon the return of normal business conditions."

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## Freight Rate Decisions

WASHINGTON, June 30.—Passing upon a complaint of the J. D. Crosby Co., Pawtucket, R. I., Examiner A. J. Sullivan in a proposed report has recommended that the Interstate Commerce Commission find that rates charged on coiled hot-rolled steel from points in Ohio, Pennsylvania, West Virginia and New York to Pawtucket were not and are not unreasonable. Prior to May 20, 1930, fifth class rates were charged. Subsequently the distance scale prescribed in the general steel rate case was applied.

Rates on iron and steel scrap, in carloads, from Chicago and Milwaukee to New Orleans were ordered reduced from 35.5c. and 40.5c. per 100 lb. respectively to 30.5c. and 32.5c. respectively, effective not later than Sept. 28, in a decision of the Interstate Commerce Commission made public last Saturday. The lowered rates are the same as those applying in the reverse direction, from New Orleans to Chicago and Milwaukee. Complaint against the Chicago-Milwaukee-New Orleans rates was made by Dibert, Bancroft & Ross Co., Ltd., operating an electric steel foundry at New Orleans. The commission also awarded reparation on shipments to cover the difference between the rates charged and those prescribed.

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Sales of iron and steel forgings, totaling $156,249,000 f.o.b. factory, were made in 1929 by 218 plants engaged primarily in that line of production, according to the Bureau of the Census. The report does not include forgings made in steel works or rolling mills nor those made in other industries as secondary products. Forged products, such as tools, for which separate census classifications are provided, and forged parts made and installed by manufacturers of motor vehicles, railroad cars, machinery, etc., also are not included in the report.

# Curtailment of Automobile Output Is Expected During July

DETROIT, June 29.

A DISTINCTLY more cheerful sentiment has pervaded the automobile industry since President Hoover announced his plan for a year's moratorium on war debts. Although there is no tangible evidence pointing to an active summer in motor car production, the fear and hesitancy which prevailed in recent weeks has been replaced by a spirit of confidence. The industry's executives seem to feel that the period from the middle of July until the middle of August will be the lowest point of the summer, and indications are that numerous plants will shut down for at least two weeks then for inventory purposes.

There has been only a slight decline in output the past week, so that the month's total should be a minimum of 270,000 units. A considerable falling off in July is expected but the extent of the drop is impossible of prediction. Chevrolet's assemblies in June probably will be about 85,000 cars, with some 66,000 scheduled for July. It must be remembered, however, that almost every month this year Chevrolet's actual production has exceeded early estimates. The Ford Motor Co. is likely to make 85,000 cars this month, but its July program is not known, except that it will show a seasonal decline from that of June.

One trade authority places retail domestic passenger car sales in April at approximately 266,000 units, with Ford registrations at 81,000 cars, against Chevrolet's 80,000. Since Ford has consistently led Chevrolet in light truck registrations, Ford's sales in the aggregate were the highest in the industry by a small margin. While May registrations are not yet available for the entire country, it is believed that the passenger car total will be about 250,000 units, which is not far under the April figure. June has brought a further recession, but not an alarming one. The situation, so far as it affects the Chevrolet company, is succinctly described by H. J. Klingler, vice-president and general sales manager: "The brightest spot in the country is the area along the North Atlantic Seaboard. We are doing more business there than we ever did. This fact is significant because that area first felt the effects of the stock market slump, and it appears to be the first to recover. Similarly, the Pacific Coast, although never so hard hit as the rest of the country, is showing favorably on our sales chart. In the South, mills which had been idle for months are starting operations on a curtailed basis. The drought area in the middle and south central part of the country requires the stimulus of a new crop for recovery, and by fall such stimulus will be felt. In our own organization we did not feel the effects of the depression last year until June, with the result that the first five months were normal. Yet in April of this year we built nearly as many cars as last April, and in May we exceeded last May's figure. There has been a letup in June, but it has been only a seasonal decline from May and not the sudden drop experienced in June last year. The remainder of this year should parallel previous normal years."

**Chrysler production in June was about 29,000 units, compared with 25,000 in May and 31,000 in April. Gain was due to increased output of new Plymouth. Chrysler assemblies in second quarter were about 87,000 units against 55,000 in first quarter.**

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**Chevrolet's output in June estimated at 85,000 cars, with July schedule of 66,000 cars. Ford's June production believed to have been 85,000 units.**

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**New Nash features synchro-safety-shift transmission with helically-cut, second-speed gears. Nash, Packard and Plymouth production is up on account of stocking dealers with new cars.**

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**April passenger car registrations in United States placed at 266,000 cars, with Ford slightly in the lead. May retail sales estimated at 250,000 units, with June bringing a further recession.**

### New Plymouth Attracts Attention

THE new Plymouth, to be announced shortly, continues to be the most-talked-about car in Detroit. The Plymouth division of Chrysler Corpn. will go into July with 3000 to 5000 orders held over from June, and new cars are leaving the plant by driveaway and rail at the rate of more than 800 a day. Production is being increased rapidly and it is anticipated that the June program of 11,000 cars will be fulfilled, while the July schedule probably will call for 15,000 cars for the domestic market alone. Added to this is the possibility that more than 2000 cars will be built for Canadian and export shipment. If a total of more than 17,000 cars is manufactured next month, all Plymouth production records will be broken. The largest single month in

the company's history was May, 1929, when slightly more than 17,000 units were turned out. This showing of the Plymouth division indicates a total output in June by the Chrysler Corpn. of about 29,000 units, compared with 25,000 in May and 31,000 in April. Chrysler's second quarter output is expected to be about 87,000 units, against 55,000 in the first quarter.

Chrysler and Chevrolet are reported to be placing contracts for their third quarter steel requirements. Purchases of steel for Chevrolet and Plymouth will help considerably in bolstering a drooping steel demand in this district, but even with support from these two sources, releases in the near future will be meager. It is interesting to note that there is a spirit of cooperation on the part of the purchasing departments of at least several motor car companies in connection with the attempt of mills to raise prices on light-rolled steel.

The new Nash has as a chief feature the synchro-safety-shift transmission with helically-cut, second-speed gears. It has the Vee-type front which is so popular this season and has many refinements making it more sound-proof than heretofore. It likewise has retained many of its former specialties, such as twin ignition. The offering consists of three straight-eight groups and a six-cylinder series. In order to produce cars for dealers it is understood that Nash has doubled its working force in the past 60 days and is now employing more than 8500 men.

### Some Curtailment of Output

So far as the remainder of the industry is concerned, there has been little change, aside from a paring down in certain cases. Auburn probably will not reach 5000 cars this month, and Buick will make little more than 8000 cars. Oldsmobile has cut down considerably from its May schedule. Perhaps the most drastic curtailment of production has been by Hudson, which is operating at a low rate. An outstanding exception to the general decline of output in the high-priced field in Packard, which has recently stepped up assemblies substantially following the announcement of its new models. It is notable that two manufacturers who have introduced new cars recently, namely Packard and Nash, have not incorporated free wheeling. As an explanation of this decision it is said that some makers are not sold on the free-wheeling principle, although all are eager to add features which make easier the shifting of gears. It is reported here that the Bendix Aviation Corpn. will announce shortly a new free-wheeling device which contains a new transmission with novel improvements in gear shifting.

For the Chrysler Imperial Eight the company's engineers have developed a cast iron brake drum with a chrome-nickeled flange which has a Brinell hardness of 220 and can be machined only with tungsten carbide tools. Recently the Cadillac company began the manufacture of cast iron brake drums and it is understood that one of the leading low-priced car builders is experimenting with this type of brake drum with a possibility that it may adopt it before the end of the year. The larger, more powerful brake drums are necessitated by the higher speeds which cars are constantly attaining.

### Trucks May Use Diesel Engines

The immediate future of the Diesel motor, so far as automobile transportation is concerned, is in the truck field, according to C. L. Cummins, Columbus, Ind., who has developed the Cummins Diesel motor. This motor will be placed in a three-ton, speed-type truck shortly to make a non-stop, pay-haul run from New York to San Francisco, carrying sufficient fuel for the entire trip. It is probable that the total cost of the journey will be the lowest on record, as the expense of running the Diesel engine car in the recent Indianapolis races was remarkably low. The non-stop feature is designed to emphasize the great cruising radius of a Diesel powered car, two metal drums full of crude oil probably being enough to carry the truck from the Atlantic to the Pacific. These drums would be carried back of the driver's seat, with plenty of room left for the pay load.

The cautious policy of the automobile industry in manufacturing only sufficient units to meet the retail demand is well illustrated in the case of a prominent motor truck maker which does not start building a truck until the retail order for it is at hand. The fact that trucks today carry hundreds of parts as special equipment is one reason for this conservatism. It used to be that truck plants were content to build merely the chassis, shipping it to dealers, who bought bodies direct from truck body manufacturing companies. Now that passenger car makers, especially in the low-priced field, have entered more vigorously into the large potential light truck market, this policy has rapidly changed and today most of the trucks leave the manufacturer fully equipped with both chassis and body. This has made it essential for the manufacturer to put huge investments into truck production facilities. One of the larger truck companies has a permanent display at its Detroit factory showing some 50 different kinds of trucks. This display alone represents an outlay of $200,000. Two other important truck builders likewise have similar exhibits in this city.

The Great Lakes Steel Corpn. is expected to put its new 10-in. merchant bar mill into operation within a week to 10 days. This will mark the completion for the present of its building program, which has included six open-hearth furnaces, blooming mill, hot strip mill, 14-in. merchant bar mill and 10-in. merchant bar mill.

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## Iron Ore Imports Make Good Gain

Imports of iron ore into the United States in May are reported by the Bureau of Foreign and Domestic Commerce at 194,397 gross tons. This is an increase of 20 per cent on the 162,652 tons coming in in April, and is the largest month's total since that of last September. Compared with May, 1930, however, there was a sharp dropping off and the same is true of the five-month period.

For the first time in the history of our import movement, Russia furnished a larger tonnage of iron ore than did any other country. Chile has led in this respect for many months, but in May dropped nearly 6000 tons behind the Russian volume. French Africa was in third position.

In the first five months of the year imports have totaled 770,736 tons, compared with 1,401,756 tons in the corresponding period of last year. The drop represents about 45 per cent.

Owing largely to the heavy tonnage of Russian imports in May, Russia has taken second position for the five months, with about 21.5 per cent of the total incoming tonnage, although still less than half as heavy as imports from Chile, which constitute about 55 per cent of the total. French Africa, Sweden, Spain and Cuba, in third, fourth, fifth and sixth positions respectively as suppliers of ore in the five-month period, had an aggregate less than the Russian tonnage.

**Sources of American Imports of Iron Ore**

(In Gross Tons)

| | May | | Five Months Ended May | |
|---|---|---|---|---|
| | 1931 | 1930 | 1931 | 1930 |
| Canada | ..... | 3 | 9 | 153 |
| Cuba | ..... | 39,054 | 23,000 | 183,654 |
| Chile | 70,596 | 138,833 | 418,521 | 840,806 |
| Spain | ..... | 7,900 | 28,337 | 42,383 |
| Sweden | ..... | 15,797 | 37,223 | 85,219 |
| French Africa | 20,780 | 51,230 | 40,382 | 128,775 |
| Russia | 76,291 | ..... | 165,585 | ..... |
| Other countries | 26,730 | 38,555 | 57,479 | 120,766 |
| Total | 194,397 | 291,372 | 770,536 | 1,401,756 |

# GOOD WILL TURNS THE TIDE

FOR a full week the world has been exposing itself to the contagion of good will. That right - about - face in thought and feeling is today the most dynamic and significant factor in the business outlook both at home and abroad.

President Hoover's debt proposal has produced effects that are without a parallel since international relations began. For months men in every land have been looking for the first sign of a turn toward better things. At home it has been loudly complained that we had neither leadership nor plan.

In a single week-end hour at Washington both leader and plan suddenly appeared, and in the same hour the leader applied the power that was to make the plan effective. What was the power? Nothing less than the age-old impulse of Good Will.

More than any other factor, ill will—between nations, between political partisans, between business competitors—has been outstanding in this depression. None that preceded it has been marked by such intense expressions of bitterness. Statesmen in one nation charging responsibility upon those in another; political spokesmen arraigning opposition party leaders; publicists and economists assailing legislative and administrative policies and excoriating those in authority for failure to find the way out; business men using unethical methods to wrest orders from competitors—such has been the sorry record of the past two years.

Meanwhile, men have been talking about a future war as one that might end civilization, little realizing that so much ill will was abroad —between nations, and between parties and interests in the same nation—as actually to create a world-wide state of war.

And now for a full week the world has been under the spell of a new spirit. Never has there been such world-wide accord on any matter affected with an international interest. The good will that went out from Washington has been answered by good will from every corner of the globe. A great incubus has been lifted from international relations, from business between nations, from domestic business in every land.

No, the animosities have not been healed and the economic millennium has not dawned. All the distress of an unparalleled depression is still with us. But we have had a week crowded as no other has ever been with world-wide approval of a great message of good will, and the right solution of our vexing problems has thus been advanced immeasurably. Outweighing all other gains from the President's proposal are those that will flow from its sheer friendliness.

In all the experiences of American business men through these trying months, beginning with the crash of 1929, too much of our thinking and planning has been in material and mechanical terms—in the language of charts and cycles and of this and that barometer of trade—so much so that the well being of our people has been treated as a product of mechanization along with the rest. Too little have we thought of its moral side.

How fast we come up out of the slough will depend more on the rate of repair of the moral factors than of those which lie in the domain of politics and economics.

Thus, in setting in motion a wave of good will that has generated courage, confidence and hope, President Hoover has been of incalculable help in putting his own country and all the world on the road back to happier times.

Whatever the minor fluctuations in the few months just ahead, his act splendidly marks the turning of the tide. Let his countrymen give themselves with a new resolve to the high enterprise of increasing the store of good will —internationally, politically at home, in business with the world, and in business with one another.

A. D. Findley

*Director, Iron Age Publishing Co.*

# British Foundrymen Hold Their Twenty-Eighth Annual Meeting

## Convention at Birmingham and Coventry Discusses Various Topics —Andrew Harley Elected President

THE institute of British Foundrymen held its twenty-eighth annual convention in Birmingham. Andrew Harley, foundry manager and chief metallurgical engineer to the Daimler Co. of Coventry, was elected president, and Victor Stobie, inventor of electric furnaces, and C. E. Williams, a Welsh foundryman, were elected vice-presidents.

The first paper to be discussed was "The Effect of Elevated Temperatures on the Strength of Castings," by L. W. Spring, of the Crane Co., Chicago, on behalf of the American Foundrymen's Association. Data were given to show that the creep strength of cast materials under high-pressure and high-temperature service is higher than that of forged materials. In the discussion, H. C. Dews said that firms which in recent years had specified forged steel globe valves for high-duty purposes are now reverting to steel castings.

"Factors in the Conductivity of Cast Irons," by Prof. H. Thyssen and two of his assistants at the Liége University, was presented on behalf of the Belgian Foundrymen's Association. The authors reviewed the mathematics of the theoretical principles of heat transmission and described a modified Depretz method of determining relative conductivities. Their conclusions were that conductivity is higher with an increasing phosphorus content and with diminishing diameter of bar.

Dr. Donaldson contradicted the authors' conclusions so far as the influence of phosphorus was concerned, which were in direct conflict with his own researches, confirmed by Japanese workers.

The exchange paper presented by the French association was by R. Arzens, who dealt with "The Laboratory and the Foundry." The paper outlined the duties of a metallurgical engineer in a foundry.

"Sands and Sand-Testing," by Dr. J. G. A. Skerl of the British Cast Iron Research Association, detailed the present position of the sand-testing question in Great Britain. He maintained that the American standards are not suited to British conditions. He described standard British apparatus for testing molding sands, and tabulated the results yielded by a number of representative sand deposits. In the discussion, Ben Hird stated that the effect of coal dust additions to sand was to coat the interior grains with envelopes of carbon, which increased their refractoriness. This view was confirmed by F. Hudson. It must be borne in mind that in these discussions in England there is an undercurrent as to whether the American methods or those evolved by the British Cast Iron Research Association shall be accepted as standard.

### Discussion of Silicon as Alloy

A paper on "Silicon as an Alloying Element" was read by J. Arnott, who reviewed the following alloys: iron-silicon, copper-silicon, silicon-bronze, aluminum-silicon, nickel-silicon, and nickel-copper-silicon. Special stress was laid upon the usefulness of silicon-bronze. No doubt the object of the author was to place into its proper perspective a proprietary alloy which has recently become prominent.

At a session held at Coventry, the first paper to be discussed was "The Relationship between the Engineering and Foundry Industries," by L. H. Pomeroy, managing director of the Daimler Co. It was definitely provocative in character, and was designed to show that cast iron had made little progress since 1783, as at that time cast iron was shown to have given a modulus of rupture of 50,400 lb. and 47,500 lb. per sq. in., whereas the 1918 A. S. T. M. arbitration bar requires a minimum of 45,500 lb. per sq. in. Yet the author confesses that he has seen more failures from forgings than from castings, and says "the result is that in many parts (of automobiles) castings fulfill entirely the required conditions as to strength and reliability and confer wearing qualities combined with cheapness and convenience unattainable in any other way."

J. G. Pearce presented a paper covering a few contributions made by the British Cast Iron Research Association to the study of cast irons and foundry practice during the last few years. He dealt with the recommended practice of the association for the control of foundry molding sands; with improvements in cupola melting (the "balanced-blast" cupola); and with the development of a new series of growth and scale-resisting irons. The association, it appears, has reached a critical stage in its development, as government support will no longer be accorded on the previous basis of doubling all income received from industry.

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## New York Steel Treaters Elect New Officers

J. J. Crowe, engineer in charge, research and development department, Air Reduction Sales Co., Jersey City, N. J., was elected chairman of the New York chapter, American Society for Steel Treating, at its June meeting. E. M. Wise, International Nickel Co., New York, was elected vice-chairman and T. N. Holden, Jr., E. W. Bliss Co., Brooklyn, was continued as secretary-treasurer.

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## Government Wants Metallurgist

An examination for a principal metallurgist for the United States Bureau of Mines is to be held by the United States Civil Service Commission at Washington. Applications must be on file with the commission not later than July 24. Entrance salary is from $5,600 to $6,400 a year. Competitors will be rated on their education, training and experience. They must have been graduated from an institution of recognized standing, with major work in metallurgy. There must be at least three years of professional experience, college teaching or post-graduate college training along these lines. Full information may be obtained from the commission in Washington, or at the post office or custom house in any city.

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## Coke By-Products Over $150,000,000 in 1930

Total 1930 sales of by-products obtained from coke oven operations in the United States were valued at $144,093,721, exclusive of breeze production, amounting to $9,408,549, according to the Bureau of Mines. Gas obtained from by-product ovens totaled 724,103,004,000 cu. ft., of which 442,118,328,000 cu. ft. was sold, with steel or affiliated plants using 231,232,552,000 cu. ft. of this amount and 164,689,727,000 cu. ft., distributed through city mains.

Tar production from the ovens was 602,485,929 gal., and sales were 314,865,294 gal., valued at $15,562,963. Ammonia liquor production amounted to 49,031,133 lb., of which 45,368,290 lb., valued at $2,236,063, was sold. The output of sulphate equivalent of all forms (including the ammonia) was 1,538,044,492 lb., and sales were 1,492,061,482 lb.

Production of light oil derivatives amounted to 145,432,827 gal., while the production of crude light oils was 178,325,952 gal.

## Coke Output Declined 3.9 Per Cent in May

By-product coke production in May declined to 3,125,571 tons, an average of 100,825 tons a day, from 3,146,490 tons in April, a daily average of 104,883 tons, according to the Bureau of Mines. The daily rate decline was 3.9 per cent, the decrease at furnace plants averaging 4.7 per cent, compared with a decline of 2.2 per cent at merchant plants.

Eighty-eight plants were active in May and produced almost 60 per cent of their capacity. Stocks of unsold coke on June 1 amounted to 3,062,151 tons, against 2,280,542 on June 1, 1930.

Production of beehive coke in May was 93,900 tons, the lowest in any month since the early history of the industry. Total output of all coke was 3,219,471 tons, or about 1,318,000 tons less than in May of last year.

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## Course in Machine Design of Aid to Apprentices

To extend the work given in its apprentice course to drafting apprentices, Brown & Sharpe Mfg. Co., Providence, R. I., suggested two years ago to the engineering department of Brown University that a special course in machine design be included with the various extension courses offered by the university. The primary thought of the Brown & Sharpe Mfg. Co., in making this suggestion, was that the engineering department of the university was equipped to give in such a course the theoretical background of machine design that would be in advance of the instruction given in the Brown & Sharpe Mfg. Co.'s regular apprentice course. The university welcomed the suggestion and laid out a two-year course, under the direction of Prof. James A. Hall and Prof. Zenas R. Bliss of the division of engineering.

The course was laid out from a purely analytical standpoint, so that only analytical problems were considered and all of these problems were taken from machine tool practice. The two-year course was divided into four terms, the work in the terms being arranged as follows:

First term: Static forces and friction.
Second term: Velocity analysis; dynamic forces; theory of gears.
Third term: Internal stresses, strength of materials, including design of shafting, springs, frames, etc.
Fourth term: Dynamic stresses; theory of deflection, using graphical methods; theory of lubrication; principles of hydraulics applied to machine tools.

No attempt was made in the course to teach drafting, but, as outlined above, it was intended to give a theoretical background to machine design approached from analytical practice.

Not only was the course made available for Brown & Sharpe apprentices (both machinist and drafting apprentices), but for others employed elsewhere who had qualifications to take up the work. As an encouragement to its apprentices, the Brown & Sharpe Mfg. Co. agreed to reimburse those who completed the course for one-half of the tuition fee of $80.

This opportunity for the apprentices and others attending the course to gain further knowledge of the principles of machine design, particularly in relation to the theoretical background and many other factors which the designer of equipment requires today, was welcomed by the students.

"The effort in establishing and carrying out the work of the course," says Brown & Sharpe, "shows what can be done along such lines when manufacturers appreciate and encourage the cooperation of the educational facilities of our universities. This effort may suggest to others the possibilities of establishing similar courses in other localities for the mutual benefit of the manufacturers and employees who avail themselves of the opportunities offered."

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## Philadelphia Steel Club Has Annual Golf Party

The Steel Club of Philadelphia, a social organization of district sales managers of that city, whose annual dinners and golf tournaments have become well known events throughout the steel trade, held its usual summer golf tournament at the Aronimick Country Club, near Philadelphia, on Friday, June 26. More than 100 participated in the golf, and a great many others attended the dinner which concluded the day's activities. The guests included many representatives of Eastern manufacturing companies and railroads. Samuel H. Baker, district sales manager of the Sharon Steel Hoop Co., is this year's Steel Club president.

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## Armstrong-Blum Acquires Tapping and Reaming Line

The tapping machine, surface grinder and reaming machine business of the Industrial Machine Co., Chicago, has been acquired by the Armstrong-Blum Mfg. Co., 333 North Francisco Avenue, Chicago.

No radical changes in design are contemplated. The tapping machines are available in ⅜ and ¼-in. sizes; other sizes, including bench machine, may be added later. The trade name of all machines will be changed to "Marvel," although in the company's literature reference to the Industrial trade name and type numbers will be included to facilitate reference in catalogs. David Lopez of the Industrial Machine Co. will be identified with the Armstrong-Blum company.

## Says Better Advertising Means More Business

Stressing the high value of advertising leadership in the conquest of marketing, Bennett Chapple, vice-president of the American Rolling Mill Co., Middletown, Ohio, addressed the Cincinnati Association of Industrial Marketeers at its monthly meeting at the Twin Oaks Country Club, Cincinnati, last Friday night.

Excerpts from Mr. Chapple's address follow:

"Better advertising means more business. This was clearly indicated at the recent convention of the Advertising Federation of America in New York, which proved to be a high point of recognition of advertising in its service to the world. Business executives and educators of the nation all put a high value on advertising leadership in the conquest of marketing, which has taken the center of the stage. It is a challenge to advertising men to renew their efforts, for better advertising men mean better advertising.

"Advertising men can take a leaf out of the experience of business, which has taken advantage of the depression to put its house in order by thorough overhauling.

"But what about our own particular job? Advertising is playing a more important part in industry every day, and it is our responsibility to see that our work is effective. New ideas, new plans, new methods of reaching the market require greater effort today than ever before.

"Management feels the responsibility of invested capital and the necessity of earning a legitimate profit thereon. To try to do this without help of advertising in this modern day and age is adding greatly to the problem. The difficulty may be that the executive does not understand just how advertising can help, and the chances are he has an advertising department that is neither constructive nor forceful enough to be of real help to him. The industrial advertising man must sell himself to his company in such a way that he can take a definite part of the load of making the business pay."

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Porcelain Enamel Institute, 612 North Michigan Avenue, Chicago, has added a manufacturers' technical consultation service to its other activities. The service is for the benefit of manufacturers who wish to determine whether porcelain enamel is a finish adaptable for use on their products.

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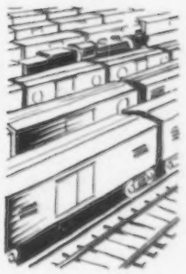
New Jersey Zinc Co. is offering a new sheet zinc, said to have unusual bending properties, which is recommended by the company for roofing, cornices, gutters, flashings and other formed articles involving intricate bending and seaming.

# Volume of Protests May Delay Action on Freight Rate Rise



## Railroads' Decision to Make No Exceptions in Advance Brings Flood of Objections

WASHINGTON, June 30.—Proceedings before the Interstate Commerce Commission in the general freight rate advance case promise to consume more time than the "emergency" plea of the railroads implied. It is now seriously doubted that the commission will see fit to act on the request of the carriers that the investigation be of a limited character to determine whether the proposed charges should be permitted to become effective without suspension.

The belief that the commission will not act as soon as the railroads had suggested has been heightened by two particular developments. One is the statement made to the commission last week by the carriers that they were prepared to make a 15 per cent increase in all existing freight rates, with no exceptions. The other is the growing accumulation of protests from State commissions, individual shippers and shippers' organizations either against the proposed increased rates or against any precipitate action by the commission. The iron and steel industry, with limited exceptions so far, has not filed communications with the commission regarding the proposed increased rates.

### Weirton Steel Enters Protest

The Weirton Steel Co., however, through Vice-President W. F. Morris, Jr., has informed the commission in a letter that it is "utterly opposed to any increase in the rates on raw materials used in the manufacture of iron and steel, such as ore, coal, limestone, etc." The letter pointed out that the industries are in the same condition as the railroads insofar as business is concerned. It stated that "many of the iron and steel interests are working in red figures and certainly few, if any, are earning their dividends."

Since it is the purpose of the railroads to seek a 15 per cent increase to apply on all rail and rail-and-water rates, it seems altogether likely the commission will get appearances from protesting shippers which it apparently thought could be eliminated from the record and thereby expedite the case. It will be recalled that on June 19 the commission addressed an order to the railroads inquiring if they proposed to make any specific exceptions on any commodities in making increases, if granted. Quickly responding, the carriers met in Chicago on June 24 and rushed by air mail a statement which reached the commission on the day following, saying the railroads are prepared to make a 15 per cent increase in all existing rates.

The commission had asked specifically if the carriers proposed to make increases in all existing rates on iron and steel products, non-ferrous metals, agricultural products, including livestock, lumber, automobiles, petroleum and class rates. These particular groups were evidently named because the railroads had either voluntarily reduced rates on them recently or contemplated doing so, as in the case of the short notice application to lower short haul rates on iron and steel products in Central Freight and Trunk Line territories. The carriers said it is proposed to make the increase in these and other commodities by the use of percentage supplements to tariffs. As to coal, coke and certain other commodities it is proposed to file specific tariffs complying with the ordinary requirements of tariff publication.

With the carriers providing for no exceptions, it is assumed that additional protests, involving longer investigation than would have been otherwise entailed, will be filed with the commission. A number already have been filed, and the volume of protests now has reached good-sized proportions covering a wide range of products. Protests against increases on agricultural products are especially notable and are emphasized in those filed by commissions in agricultural States. Different industries also have protested and some of which are pointed in their criticism of the railroads by reason of both proposed increases and the suggested method for quick procedure. The general theme is that industry and agriculture, together with other lines, are also suffering from economic conditions just as the railroads are.

While the petition of the railroads asked for a 15 per cent rate advance, it was generally thought that the carriers would make exceptions in rates on iron and steel, non-ferrous metals and other products which recently had been reduced or whose reduction was sought. It is now plain that the railroads want permission to increase these as well as other rates, but it is still doubted that a full 15 per cent increase would be applied, even if it were granted. Competitive conditions are held to make such an increase impracticable. In either case, it is held to be unusual that the railroads reduced rates to a point they considered necessary to meet competition only to turn about and increase them.

In connection with the sixth section application to reduce rates on iron and steel products for hauls of 100 miles and less, it was found first necessary to file a fourth section application in order to cover requirements of the long-and-short haul provision of the Interstate Commerce Act. This latter application has been granted, but nothing has as yet been done on the sixth section or short notice application which sought to apply the reduced rates on one day's notice or not later than July 1. Early action is expected, however.

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## Freight Rate Hearings to Begin July 15

WASHINGTON, June 30.—The Interstate Commerce Commission today announced that the first hearing in the proposed 15 per cent freight rate advance case will begin in Washington on July 15. Railroads and those supporting their petition for an increase will be heard at this proceeding.

Other hearings will be held for the further cross-examination of witnesses presented at the initial hearing and for the submission of evidence by protestants.

The commission has requested that all who desire to offer evidence in opposition to the increase notify it on or before July 20, indicating the general character of the evidence and the approximate amount of time required. With a view to expediting the case as much as possible, the commission asks that evidence be presented as concisely as possible, using exhibits to curtail oral testimony.

Hearings will probably be held at other points than Washington, but the number of such places will be limited. Following receipt of the requests for hearings, the commission will prepare a schedule covering dates, places and order of testimony.

# ▲▲▲ PERSONALS ▲▲▲

J. M. HIPPLE has been appointed general works manager for the Westinghouse Electric & Mfg. Co., East Pittsburgh, and C. H. CHAMPLAIN, manager of the Westinghouse works at Sharon, Pa., for the last eight years, has succeeded him as works manager at East Pittsburgh. Mr. Hipple has been works manager of the company's East Pittsburgh works since Sept. 1, 1927. He is a native of Jefferson, Ohio, and after graduation from Ohio State University, Columbus, in 1898, he joined the Westinghouse company. After one year in the testing department, he was made manager of the motor engineering department. He headed this department until his appointment as works manager.

M. L. FAWCETT succeeds Mr. Champlain as works manager at Sharon. A. B. REYNDERS, in addition to his present duties as works manager at East Springfield, Mass., will have supervision over the operations of the Mansfield, Ohio, works, and J. E. BARKLE will have supervision over the Newark, N. J., works in addition to his duties as works manager at South Philadelphia. E. M. OLIN, works manager at Mansfield and H. E. MILLER, works manager at Newark, retain their present positions, reporting to Mr. Reynders and Mr. Barkle, respectively.

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JOHN E. GARRITY has been named Pacific Coast representative for the Superior Steel Corpn., Pittsburgh, with headquarters at Los Angeles. Until July, 1930, Mr. Garrity served as general sales manager for the West Leechburg Steel Co., Pittsburgh, having been identified with that organization in various capacities for 20 years.

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J. C. C. HOLDING, vice-president and manager of the American Stainless Steel Co., Pittsburgh, sailed this week on the Bremen for a 30 days' business trip to England.

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FRED J. GRIFFITHS, president, Republic Research Corpn., has been elected a director of Eaton Axle & Spring Co., Cleveland, succeeding J. F. Beans, Massillon, who resigned.

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CARL B. RETTIG has resigned as Eastern district sales representative of the Empire Steel Corpn., Mansfield, and on July 1 became associated with Mahoning Valley Steel Co., Niles, Ohio, as sales representative.

J. M. HIPPLE

C. H. CHAMPLAIN

RANDOLPH W. SHANNON has been appointed manager of sales in the Philadelphia district for the American Sheet & Tin Plate Co., Pittsburgh, succeeding THOMAS W. SIMPERS, who retired on June 30, following a long and successful career in the steel industry. Mr. Simpers' first employment was in 1882 with the McCullough Iron Co., one of the first producers of galvanized sheets in this country. In 1888 he went with the Standard Iron Co., Bridgeport, Ohio, which later became the Aetna Standard Iron & Steel Co., and which in 1900 was partitioned among the American Sheet Steel Co., the American Tin Plate Co. and the National Steel Co. Mr. Simpers has represented the American Sheet & Tin Plate Co. in Philadelphia since 1900, and now retires under the pension plan. Mr. Shannon left Princeton University in his junior year to enter the Army and saw active service in France during the World War. After demobilization, he took the students' training course of the Sheet & Tin Plate company, and since 1921 has been connected with the company's Detroit and New York sales offices. He is the author of "Sheet Steel and Tin Plate," a book intended to assist the layman in the most economical utilization of sheet steel and tin plate, which was published by the Chemical Catalog Co., New York, in 1930.

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GEORGE D. BUCKWELL, since August, 1928, manager of pig iron sales for the Davison Coke & Iron Co., Pittsburgh, has resigned and is taking a three months' European trip before resuming other business activities. He has been succeeded by W. S. SCOTT, who has been connected with the Davison company in pig iron sales work since May, 1929. Mr. Scott formerly was identified with the Reliance Coke & Furnace Co., Pittsburgh, whose Claire furnace was taken over by the Davison Coke & Iron Co. two years ago.

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C. B. POLLOCK, for several years vice-president in charge of operations of the Newton Steel Co., Youngstown, has become general superintendent of the Toronto, Ohio, plant of Follansbee Brothers Co., Pittsburgh.

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WILBUR J. WRIGHT, who has been identified for the past 20 years with E. F. Houghton Co., Philadelphia, has established himself as a manufacturers' agent, to specialize in oils, leather and leather packing, carburizer and Celeron bearings, with offices at 18,151 Clifton Road, Lakewood, Cleveland.

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JOHN L. JONES, formerly manager of the Lansing Foundry Co. and more recently with the foundry division of the Oakland Motor Car Co., Pontiac, Mich., has become associated with the sales engineering staff of the Great Lakes Foundry Sand Co., Detroit.

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PHILLIPS ISHAM, New York, has been appointed New England sales agent for the Woodward Iron Co., Woodward, Ala. He will continue as agent in the New York territory, where he has represented the Woodward company for the past 25 years.

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JOHN M. ROBB, JR., for the past 12 years associated with Park &

Williams, Philadelphia, has become identified with Hickman, Williams & Co., Philadelphia.

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JOSEPH E. SLATER has been made a member of the consulting engineering firm of Coverdale & Colpitts, New York.

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E. E. KNOX, formerly sales manager of the Bury Compressor Co., Erie, Pa., has established offices in the Ariel Building, Erie, to deal in new and good used compressors and power equipment. He was identified with the Compressor company for 27 years.

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FRANK W. JONES, who for many years was Philadelphia sales manager for the Eastern Steel Co., Pottsville, Pa., whose plant was recently sold in receivership proceedings, has been appointed general manager of the Hanover Wire Cloth Co., Hanover, Pa.

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STEWART M. MARSHALL, whose connection with the consulting engineering firm of Perin & Marshall, New York, now the Perin Engineering Co., was terminated in January, 1930, and who has been abroad for the past 18 months, most of the time in India, has now returned to the United States. His connection with Mr. Perin dated from 1916. He is not yet ready to announce his plans, but for the next several weeks may be reached at 11 West Forty-second Street, New York.

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JOSEPH M. MERROW, president since 1897 of the Merrow Machine Co., Hartford, Conn., last week was tendered a luncheon by C. L. TAYLOR, CLARENCE E. WHITNEY and others at the Hartford Club on the occasion of his eighty-third birthday.

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W. B. COULLIE, general sales manager, Harbison-Walker Refractories Co., Pittsburgh, was elected president of the American Refractories Institute at its annual meeting held recently in St. Louis. W. J. WESTPHALEN, vice-president and general manager, Leclede-Christy Clay Products Co., St. Louis, was named first vice-president; A. P. TAYLOR, president, Charles Taylor Sons Co., Cincinnati, second vice-president; C. C. EDMUNDS, treasurer, McLain Fire Brick Co., Pittsburgh, treasurer, and MISS DOROTHY A. TEXTER, Pittsburgh, secretary. The following were elected directors: GEORGE A. BALZ, president, Seaboard Refractories Co., Perth Amboy, N. J.; J. E. LEWIS, president, Harbison-Walker Refractories Co., Pittsburgh; JOHN R. SPROUL, president, General Refractories Co., Philadelphia; A. P. GREEN, president, A. P. Green Fire Brick Co., Mexico, Mo.; J. D. RAMSAY, president, North American Refractories Co., Cleveland; H. L. TREDENNICK, president, Haws Refractories Co., Johnstown, Pa.; J. H. CAVENDER, vice-president and sales manager, North American Refractories Co., Cleveland; A. P. TAYLOR, president, Charles Taylor Sons Co., Cincinnati, and S. M. KIER, vice-president, General Refractories Co., Salina, Pa.

C. E. SKINNER

H. L. BROWN

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W. W. COLEMAN, president, Bucyrus-Erie Co., South Milwaukee, Wis., has returned from a European tour of several months' duration. Considerable time was spent in England, the seat of Bucyrus-Ruston, Ltd., a subsidiary acquired about two years ago.

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C. G. BACON, director of wheel research of the Armco Railroad Sales Co., has resigned from that position but is retained by the company in a consulting capacity in connection with its wrought steel wheels.

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DR. MAX G. PAULUS has been appointed assistant general manager of manufacturing for the Standard Oil Co. of Indiana. Heretofore he has been manager of manufacturing in the company's Rocky Mountain division, at Casper, Wyo.

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CHARLES E. SKINNER, assistant director of engineering, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., was elected president of the American Institute of Electrical Engineers for the year beginning Aug. 1, 1931, at the annual meeting of the institute held at Asheville, N. C., on June 22.

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H. L. BROWN has been appointed district representative for the Superior Steel Corp., Pittsburgh, with headquarters at 2001 Carew Tower, Cincinnati. Since Jan. 19, Mr. Brown has been associated with Dean, Higgins & Co., Cincinnati, as vice-president and manager of sales in the southern Ohio district, handling the products of the West Leechburg Steel Co., Pittsburgh, and the Baltimore Tube Co., Baltimore. Previously he was identified with a wire fence manufacturing company in the Cincinnati district for a number of years, and during the war served as executive assistant in charge of production of ordnance equipment and munitions.

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## May Automobile Output Was 315,115 Units

WASHINGTON, June 30.—Reflecting a drop of 20,593 units, the production of motor vehicles in the United States in May totaled 315,115, compared with 335,708 in April, according to reports received by the Bureau of the Census from manufacturers.

The output of passenger cars decreased 15,948 to 269,080, while motor truck production showed a decline of 4320 to a total of 45,695. The production of taxicabs dropped to 340 from 665.

In the first five months of 1931, the output of motor vehicles was 1,319,016, a drop of 544,859 under the corresponding period of last year. Passenger car output was 1,102,637, a decrease of 472,251, while the motor truck production was 213,923, a decrease of 71,098. The production of taxicabs fell to 2456 from 4165.

Canadian production of motor vehicles in May was 12,738, compared with 17,159 in April. The passenger car output dropped to 10,621 from 14,043, while the production of motor trucks declined to 2117 from 3116.

In the first five months of 1931, the Canadian motor vehicle output totaled 59,257, against 95,595 in the corresponding period of last year. The passenger car output was 47,228, compared with 81,165, and motor truck production was 12,029, compared with 14,430.

# OBITUARY

WILLIAM L. SAUNDERS, chairman of the board of the Ingersoll-Rand Co., New York, died at Teneriffe, Canary Islands, while on a world cruise, on June 25, aged 74 years. He was a native of Columbus, Ga., and

W. L. SAUNDERS

was graduated from the University of Pennsylvania in 1876. For the following two years he was engaged in newspaper work in Philadelphia and then became engineer in charge of dock construction at Black Tom Island, New York Harbor, serving in that capacity until 1882. Later Mr. Saunders became engineer, vice-president and president of the Ingersoll-Sergeant Drill Co., and president of the Haesler Tool Co. and the New York Imperial Tool Co. When the Ingersoll-Sergeant company was succeeded by the Ingersoll-Rand Co., he became president and ultimately chairman of the board. His career as an engineer extended over more than half a century, with a record of distinguished public service in his later life. Perhaps the most important public position he held was that of chairman of the Naval Consulting Board, to which he was appointed by President Wilson in 1915 and which he filled for many years. Mr. Saunders was the inventor of a number of devices now generally used and was interested particularly in the application of compressed air to engineering problems. He founded the annual award for achievement in mining by the American Institute of Mining and Metallurgical Engineers, of which he was president in 1915.

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ROBERT S. CARTER, president of the Latrobe Tool Co., Latrobe, Pa., and of the J. M. Carpenter Tap & Die Corpn., died on May 17.

WALTER E. COFFIN, consulting engineer since 1896 of the National Malleable & Steel Castings Co., Cleveland, died June 25, aged 71 years. He was well known in the railroad field as the inventor of various devices used in railroad equipment.

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I. WALTER JENKS, who before his retirement last year was general manager of the bar and hoop department of the Carnegie Steel Co., Pittsburgh, died at his home in that city on June 25. Mr. Jenks was born in England 73 years ago and came to this country in 1880, where he began work as a roller in the mills of William Clark's Sons Co. at Pittsburgh. He later went with Watson & Co., Pomeroy, Ohio, where he remained until 1885. Returning to Pittsburgh, he went with La Belle Steel Works, Allegheny, Pa., where he later served as general superintendent. He next served as general superintendent for the Pittsburgh district mills of the Crucible Steel Co. of America, later going with the American Steel Hoop Co. as general manager. When the latter concern was absorbed by the United States Steel Corp. in 1901, he was made manager of the Carnegie bar and hoop department, which position he held until his recent retirement.

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W. F. LEWIS, superintendent of the roll designing department at Duquesne works, Carnegie Steel Co., died on June 23, aged 64 years.

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SIR HUGH BELL, a director and formerly vice-chairman of Dorman, Long & Co., Middlesbrough, England, died suddenly in London on June 28, aged 87 years. He was president of the (British) Iron and Steel Institute from 1907 to 1910.

## Fabricated Steel Orders Off Sharply in May

WASHINGTON, June 30.—Bookings of fabricated structural steel in May totaled 134,301 tons, according to reports received by the Bureau of the Census from 224 establishments. Orders reported in April by 212 establishments amounted to 254,255 tons.

Estimated orders for all plants in May aggregate 152,800 tons, or 38.2 per cent of capacity, compared with 292,800 tons, or 73.2 per cent of capacity.

May shipments reported by 218 plants were 102,865 tons, against 110,736 tons reported by 206 plants in April.

## New Manganese Electrode

An electrode which utilizes the "shielded arc" process to build up worn manganese steel castings has been developed by the Lincoln Electric Co., Cleveland. The new electrode, known as Manganweld, is 11 to 15 per cent manganese steel and the weld is "air toughening," which eliminates the necessity of quenching the bead. A heavy extruded coating provides a layer of easily removable slag, which further protects the weld from the harmful effects of the air.

"Manganweld" causes the weld to remain in the Austenitic state even on slow cooling. Water quenching which sets up localized strains, often resulting in checks and unsatisfactory welds, is thereby avoided.

Laboratory experiments, according to the Lincoln company, show that Manganweld as deposited has a Rockwell C hardness of 5 to 10; and after cold working, attains a Rockwell C hardness of 45 to 50. Use of the electrodes, it is added, insures a dense, wear resisting deposit. They are manufactured in ⅛, 5/32, 3/16 and ¼-in. sizes of the standard 14-in. lengths.

## Standard Proposed for Fourdrinier Wire

WASHINGTON, June 30.—The Division of Trade Standards, Bureau of Standards, has mailed to manufacturers and users of fourdrinier wire cloth a recommended commercial standard for this product as adopted at the general conference of producers and users held in Washington, June 2. The proposed standard covers physical requirements for wire before weaving and wire cloth after weaving, the seam and method of inspection.

The standard adopted at the conference, which awaits acceptance of producers and users generally, was proposed as a basis of clearer understanding between these interests. The itemized purposes, as announced at the conference, were declared to be the establishing of standard nomenclature, definitions, physical requirements, methods of inspection, labeling, handling, storage and installation; securing a more intelligent application and use of the wire cloth; promoting a longer life, few shutdowns and increasing the general satisfaction in the use of fourdrinier wire cloth.

Orders for enameled sanitary ware in May totaled 170,534 pieces, according to preliminary figures of the Bureau of the Census received from 21 manufacturers. April orders amounted to 161,317 pieces.

# Production More Closely Keyed to Demand

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

OUR composite demand line for steel, based on the activity in the chief consuming industries, declined in May. Nevertheless, the relation between supply and demand in the steel industry appears to have shown some improvement. The demand line did not fall sharply, and the decline started from an April peak. On the other hand, steel production has been declining for two months and its decline has been more rapid than that in demand. Thus production and indicated requirements are more nearly in balance than at any time since last December.

Since steel production seems to have been curtailed considerably during June, while it is reasonable to hope that demand may not decline a great deal further, one may not be too optimistic in expecting a balance by autumn. That this cannot be definitely predicted is due largely to the fact that the sharpest recent declines among the items included in the composite demand line have occurred among the heaviest consumers.

Automobile production in May was disappointing and showed a somewhat more-than-usual decline. Moreover, current reports indicate the probability of an even sharper recession in the June figures. It is clear, as was to have been anticipated, that consumer purchasing power had been too much reduced to allow such sales as some of the manufacturers were forecasting a few months ago. May registrations are estimated to be 28 per cent below a year ago. The General Motors' sales figures for May were disappointing, also, particularly in that sales to users fell so far behind deliveries to dealers, thus indicating a considerable increase in dealer inventories. There seems no reason to expect that the decline in automobile production will be less than seasonal this summer, and that would mean a very low level for the year.

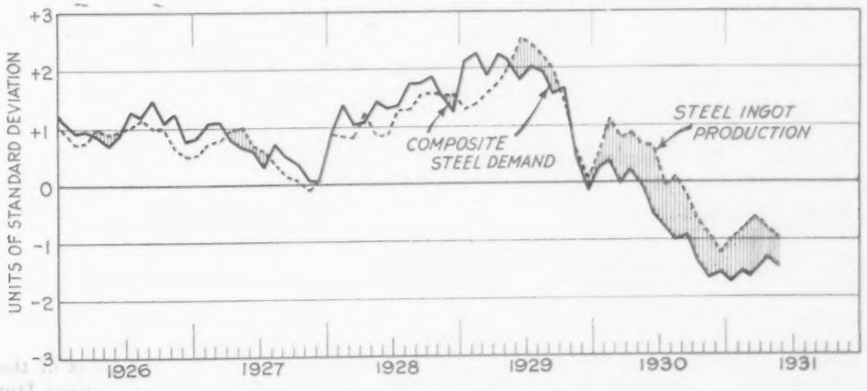
Nor does the railroad outlook promise much in the way of steel buying. Freight tonnage in May, considering the season, was off sharply to a new low level for the recession. May earnings thus far reported indicate that declines in gross and net will be in the neighborhood of 18 per cent and 30 per cent respectively. The carriers have a large surplus of equipment in a fair state of repair. It is no wonder that the buying of rails, cars and locomotives is backward; the rise in orders for locomotives in May was probably fully offset by the drop in orders for freight cars. Car-loading returns thus far in June show less than seasonal gains, so that an adjusted index of weekly figures has been touching new lows.

Building activity, also, continues to be disappointing. It is true that our adjusted index of floor space in contracts awarded showed a slight gain in May. But this index stands alone: the *value* of construction contracts awarded was down more than seasonally, permits made a new low, and the value of contemplated new construction declined. Real estate transfers in the country were the lowest on record.

Activity in mining and oil closely approximates the low levels of the recession, and the markets for most minerals and oils are such that increased production is considered undesirable.

On the other hand, weekly reports indicate a considerable recovery from the May slump in fabricated steel orders, and a fair volume of business. A more hopeful note, too, is struck by the index of general manufacturing activity. Excluding iron and steel and automobiles, a representative group of miscellaneous manufacturing industries gained in May. The activity in this group, moreover, was somewhat above the average for 1921-1927. This fact appears to furnish statistical confirmation for the opinion that a widespread miscellaneous demand for steel has been the chief standby.

It must be admitted, however, that the May reaction in machine tool orders is not altogether encouraging. Spurts in the buying of consumers' goods are not so conclusive as is a sustained recovery in the buying of equipment.




BETTER balance may be noted between supply and demand than has been seen since last December. It may be that a balance between them will be struck in the autumn. If so, we may look for sustained improvement in business.

W. W. MACON
*Editor*

# THE IRON AGE

A. I. FINDLEY
*Editor Emeritus*

(ESTABLISHED 1855)

## Technical Symposiums

EMPLOYMENT of the symposium in the programs of American technical societies is increasing. The bringing of the combined experience and opinion of different authorities to bear on a single timely subject is proving effective.

The Electrochemical Society early used the device. The group contributions it elicited for sessions on ferroalloys, electric furnace melting and industrial electric heat at conventions a few years ago were notable. The garnered data were commonly provocative of discussion, sometimes spirited; further, valuable views were thus brought out and the usual result was a crystallization of up-to-the-minute information.

In recent years, too, the American Society for Testing Materials has more freely used the method. In March of last year in Detroit a symposium on materials used in automobiles featured the society's first regional meeting. A year ago there was another on materials for aircraft. At its second regional meeting, in Pittsburgh, the same society took up welding by means of a ten-paper symposium. Last week, at Chicago, a symposium on metals at high temperatures, so extensive that a departure had to be made in getting the subject before the members, was an outstanding feature of the society's meeting.

Also should be mentioned a like treatment of malleable castings, the first of a series on foundry topics to be sponsored jointly by the Testing Materials Society and the American Foundrymen's Association. The Foundrymen's organization also has used this form of technical activity before, and the American Society for Steel Treating in 1929 conducted a notable session of the kind on nitriding.

The effect of a symposium, if properly planned, is to draw a large attendance. The standing of the contributors is a magnet. Then there is the probability that discussion will be prolific and valuable. There is a recognition that the papers must not be so numerous or the time given to the presentation so extended that general discussion is limited. The exceptions are when a highly specialized subject is covered and relatively few are well versed in it; then the free discussion is likely to be inconsequential. But a subject of broad interest still in the process of development finds considerable numbers not on the program who have items of interest to tell or searching questions to ask. Such should not be denied.

SHOULD there come about a swing toward larger consumption of scrap in basic open-hearth steel making, the relationship between open-hearth and Bessemer costs might easily be altered. At times in the past open-hearth steel brought higher figures in the market than Bessemer, but not in recent years. Back in 1911 there were several months in which Bessemer sheet bars commanded a premium over open-hearth. Identical quotations for the two descriptions are not necessarily permanent. That Bessemer steel is superior to open-hearth for a variety of purposes was pointed out by Dr. G. B. Waterhouse, professor of metallurgy at the Massachusetts Institute of Technology, in THE IRON AGE of July 5, 1928.

## Export Surplus Perennial

TOO long have we talked about the so-called necessity of "exporting our surplus." Perhaps it dates from the Centennial Year, when we passed into a period of having a "favorable balance." In the 55 years since then we have had an unfavorable balance only three times, the last time in 1893, while previous to 1876 years of a favorable balance were quite exceptional. It was in 1876, however, that we celebrated the remarkable progress we had made, all in the face of an unfavorable balance.

Every year since 1893 we have had an export surplus, and the theory commonly expressed was that, chancing to have this excess capacity, the way to meet the situation was to export the surplus and pull down average unit costs. Meanwhile our capacity has been multiplied many times in this period, and we have never exported enough to engage all the surplus capacity, or if we did we simply again increased our capacity. Constantly there has been confusion of cause and effect, exports being commonly regarded as a result of capacity, when as a rule those who created the capacity knew quite well they were going after export trade.

There has also been talk, though not nearly so much in very recent years, that we could produce more economically by working on the larger scale that export business brought about, the home consumer thereby benefiting. There never was much in the idea and there is less now.

By these widely prevalent loose notions straight thinking has been impaired, and we now have an unfortunate illustration, in the clamor for a reduction in our tariff whereby more goods will come in and more goods will go out. If American consumers will buy more foreign goods then we can sell more of the goods we make. It is perfectly clear, however, that the world, no matter how it may talk, is going in for tariffs more than ever. Our bigness is no reason why we should endeavor to furnish the world an example and set up leadership. Our bigness makes our mar-

ket all the more attractive, as involving less unit selling cost.

Talk about export surpluses, cost reduction, etc., has kept some people from recognizing—what many have recognized and everyone can—that our merchandise trade balance is really chiefly the creature of our unseen balance. Without mentioning the various items in the unseen balance, there is the long-term showing that, in the period up to 1876, much foreign capital was coming into the United States and it had to come in the form of merchandise. Afterward we paid interest and dividends on some of the investments made by foreigners and we did it with merchandise. Of course there were many other items.

Since the World War we have exported capital and, no matter how figures are arrayed, it cannot be shown that we could have done this had we not exported goods. Now there is interest return on these investments abroad to be considered. Again figures might be arrayed in an effort to show that the derangement is not so great as might be fancied. But the principle exists, and we cannot go ahead for the future as we have averaged since the war.

If there were anything in the argument that of necessity we must export our "surplus," it would have been possible at any time to solve the problem in another way, that of preventing the surplus. It would have been sufficient simply to expand capacity a little less rapidly for a period of five or ten years. If capacity has been multiplied by ten in the last half century, multiplying by only nine would have accomplished the same purpose. The reference, of course, is a collective one, and rough at that, but it serves to bring out the point. The notion of surplus has lasted many times too long to be true.

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## Scrap in Steel Making

RECORD low prices for scrap have caused many observers to suggest that there will be much heavier consumption of scrap, relative to pig iron, in making steel. The argument is simple, that the cost of scrap is well below the integrated cost of making pig iron, but the whole subject is decidedly intricate. The very fact that scrap is at record low is in itself a suspicious circumstance, particularly so when prices are made in such a narrow market. Conceivably scrap might jump several dollars a ton on the appearance of a really substantial demand, yet a demand well below what would be represented by a large swing throughout the industry from pig iron to scrap.

The heavy melting steel scrap composite of THE IRON AGE, the average of Philadelphia, Pittsburgh and Chicago, stood last week at $9.08, against an average of $16.28 in 1929 and $17.12 in 1925, the two high years since 1923. A comparison with market prices of pig iron is not in point, production cost of pig iron by steel companies being the important item, since the scrap used by steel makers who buy their pig iron is a relatively small part of the total scrap consumption.

For a test of the matter it is unfortunate that low scrap prices come at a time of very low production all around, for there is the matter of by-product coking. There is a special reason for keeping the ovens going. They can be gaited down only so far and when they are put out they must either be kept hot, at a daily fuel expense, or having allowed to become cold be rebuilt at heavy expense. Thus the time element, both as to how long low prices for scrap will prevail and as to how long the depression will last, is very important, and the depressed condition of the markets for by-products makes a further complication.

It is conceded that what would be merely a fair demand for scrap would very quickly put the market up, but a prolonged rise would be an entirely different matter. In many cases it does not pay to gather scrap at the present time, but with so much unemployment a quite moderate rise would presumably bring out about all the scrap there is, and the question is chiefly how much has accumulated.

The course of affairs in the last 10 years indicates that the outcome of scrap has substantially kept pace with the increase in steel production. With the large quantity of scrap left by the war, one might have expected a different showing. Whether in a period of depression we discard more material, to become scrap when it reaches the market, relative to the amount of steel we make, than in a period of activity, is an intricate question. Tin plate production suffers much less than other steel production, and the tin can does not come back as scrap. On the other hand, there is much steel required merely to keep the country going, an illustration being replacement of boiler tubes. Construction work involving steel leads to much wrecking of bridges and buildings. The highly competitive conditions existing lead to much replacement of equipment and there may be no little abandonment of complete plants.

On the whole it seems likely that if cost and a bare margin can be realized there will be rather a large supply of scrap relative to possible requirements.

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## Exchange of Services

IN his repudiation of a plan for the American Federation of Labor to assent to a 10 per cent reduction of wages all around, William Green is sound. A horizontal cut would not materially improve the situation. What is needful is rather a sharper reduction in some quarters and no reduction in others, i.e., a correction of unbalance.

Wages are the measure of exchange of services. Money is only the medium of exchange. Credit is the pump that puts exchange in motion. It is naturally difficult for the steel worker engaged with several thousand fellow workers to visualize that he is exchanging services with a farmer who is producing wheat, but the low prices for steel, and copper, and other commodities *ipso facto* demonstrate that the labor producing such materials is exchanging its service at a relatively low rate.

Reductions in such rates, which have already occurred extensively, do not help matters if other

workers refuse to exchange their services except on terms that causes the credit pump to stall. On the contrary they make matters worse by maintaining the flow of materials that pile up in unsold stocks. In the end production has to cease and then it is no longer a question of no reduction of wages but rather of no work.

## CORRESPONDENCE

### Two Causes of the Depression

*To the Editor:* I value the opinion of THE IRON AGE, and have been a steady reader every week for many years.

I started with the predecessors of a steel corporation in 1891. My experience has all been that of manufacturing. I started in at $3 a week as water-boy, and was finally general manager of one of the plants before I started in business for myself. I got the raw materials at the rear platform, I shot them through the machines at lightning speed to put the finished product on the shipping platform. My shop costs were always low, and my rewards were promotion and increase of salary.

I have had splendid training in manufacturing and costs, but the financial side of my training was neglected, and I had to study this phase of business very assiduously. Large corporations maintain schools of instruction for manufacture, metallurgy, and cost systems, but if they would maintain a school for financial education, I think it would broaden the scope of their future executives and employees. Today the firms that advance their men from lowly positions to those of responsibility are the ones who enjoy the greatest success with the least labor turnover.

We have all gone to seed on manufacturing at low prices, but we overlook the financial angle. For instance, scientific cost of packing, shipment, and sales. Anyone can manufacture; it takes an artist to sell, especially at a profit. Anyone can give materials away.

I believe there are two outstanding causes of this depression. One is the demonetization of silver, and the other is the placing in responsible positions of young men which are not qualified by experience to assume responsibility.

**Demonetization of Silver**

To substantiate point No. 1: Some years ago, when I was in Mexico, I found the peon might be barefooted, with a poor blanket slung over his shoulder, but he must have, and would have, a high-priced hat that would cost as much as $50. It took, roughly, two cupfuls of silver to get the hat. Today, he has to produce eight cupfuls to get the same hat, and the result is, he hasn't so much silver, and if he has, he isn't willing to part with it, so he doesn't get the hat, and the hat plant I have in mind is practically shut down, as I was in the plant last week, and when they are not running, we do not get work from them. Another cause of their depression is the fact that young men are running around without hats.

Point No. 2: Old men have been displaced repeatedly by young men "just out of college," who are termed "go-getters," "hi-pressure men" and "live wires," sons of the president, the general manager, son of this man and son of that man—all sons of those in power, pushed ahead with only their "college training." The old men have reached their position in life by courage, foresight, and well balanced minds. "Old men for counsel and young men for war." We of this date have changed that to "Young men for business; old men for the scrap heap."

**Replacing Old Men With Unseasoned Youth**

Our nation lacks balance of mind. We accomplish, but we do not count the cost (lack of financial training again). That is where the old men are useful. Young men out of college, unseasoned, can be compared to building a house out of unseasoned lumber. When the hot rays of the sun beat upon unseasoned lumber, cracks appear, big cracks. Today, when the hot sun of adversity concentrates upon the unseasoned management of the younger men, business cracks appear, great big ugly cracks—suicides, bankruptcies, failures, absconders, and defaulters. Why? Which is to blame, the individual or the system?

Today, in business, the individual has almost disappeared. We act in groups, combinations, trusts, chain stores. Our young men are afraid to go in business, alone. They want a company; a corporation. Why? Because they are afraid they will have to "buck the trust." Wolves hunt in packs. Lions hunt alone. Wolves have a system; lions are individual and fearless. When an individual wants a loan, the banker says: "What is the set-up of your organization?" When one says, "*I* am the organization", he replies, "Oh, a one-man organization." It means the individual operator must carry business life insurance more than enough to cover any indebtedness to the bank. The trust is never questioned on that point, hence a saving. In a trust, if one dies, a younger man at a less salary usually takes the place of a departed one.

**Rehabilitate Silver and Listen to the Elders**

My summary is this: By ignoring silver we shut out of our markets the purchasing power of a great part of South America, Mexico, India, and China. Therefore, let us rehabilitate silver. Secondly, let us pay more attention to the words of wisdom of elderly leaders rather than so much to the inexperience of youth.

ROYAL MATTICE.
Mattice Engineering Co., Inc.
Philadelphia.

### Change the Mental Attitude

*To the Editor:* It is deplorable to note that there are millions of people in the world today who seem to think prosperity will naturally return without effort. If we think an undertaking can be accomplished, that it is worth while and now is the opportune time, the chances are in 99 cases out of a hundred that the business will go forward and with very gratifying results. On the other hand, if we feel that, while the undertaking may be worth while, the future is uncertain and we had better wait for the return of prosperity, it is needless to say that the proposed undertaking will never materialize.

What we need more than anything else is to change the attitude of waiting on the part of the vast majority to the attitude of buy now, do it now, for there can be no return of prosperity until this attitude is assumed by the buying power. There is no shortage of wealth in the world, it is poor distribution. There is as much work to do now as there ever was. What are we waiting for?

SAMUEL H. KENNEDY.
Tunnel Hill, Ga.

The high proportion of unemployment in the building trades, around 50 per cent, is offered by Maj. Harry F. Porter, Granite City, Ill., as a proof of the unwisdom of ever striving for higher hourly scales and fewer hours of work. "Nor are the 50 per cent employed full time," he says in a monograph on the general subject.

## What Technical Men Can Do to Assure Their Own Employment

(*Concluded from page* 9)

technical mind has little consciousness of costs or the commercial aspect of the case.

Turnover among technical men is not affected by the same circumstances as those which affect shop labor. . . . The rate of turnover is less than in any other form of employment. Rapid improvement in technical processes has removed more men in technical occupations than has any other cause. A corporation usually has implicit faith in its technical men. This general tendency of corporations sometimes gives them over-confidence in their products. This faith in the technical men tends toward stability of employment, on the one hand, and stagnation on the other hand.

### Proper Study of Technology Is Man

There is one phase of technical education that I would stress. It would make technical men more valuable in their work. I refer to the study of human nature; some would say "psychology" and others would say, in the words of Gratian, "the art of worldly wisdom."

It seems to me that every technical man should start every day by asking himself: "Am I living in nature or in a world of human nature?" Some technical men, large numbers of them, in fact, appear to be thinking in a world detached from men. I feel that the proper study of technology is man.

Since the end of technology is to supply the wants of man, technical men should widen their understanding and knowledge of mankind. Shop management surely has a better understanding of men than have engineers. Certainly the sales department men think they understand their markets, and no company can exist if it does not understand the human nature or psychology of its customers. The prime requisite of good management is to know and manage men, but among technical men the tendency toward individualism keeps them from the better understanding of their associates and of the world at large. This individualism tends to make them remote and not so strong in cooperation or coordination with other parts of management.

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## Enameling Mechanized on Counter-Flow Principle

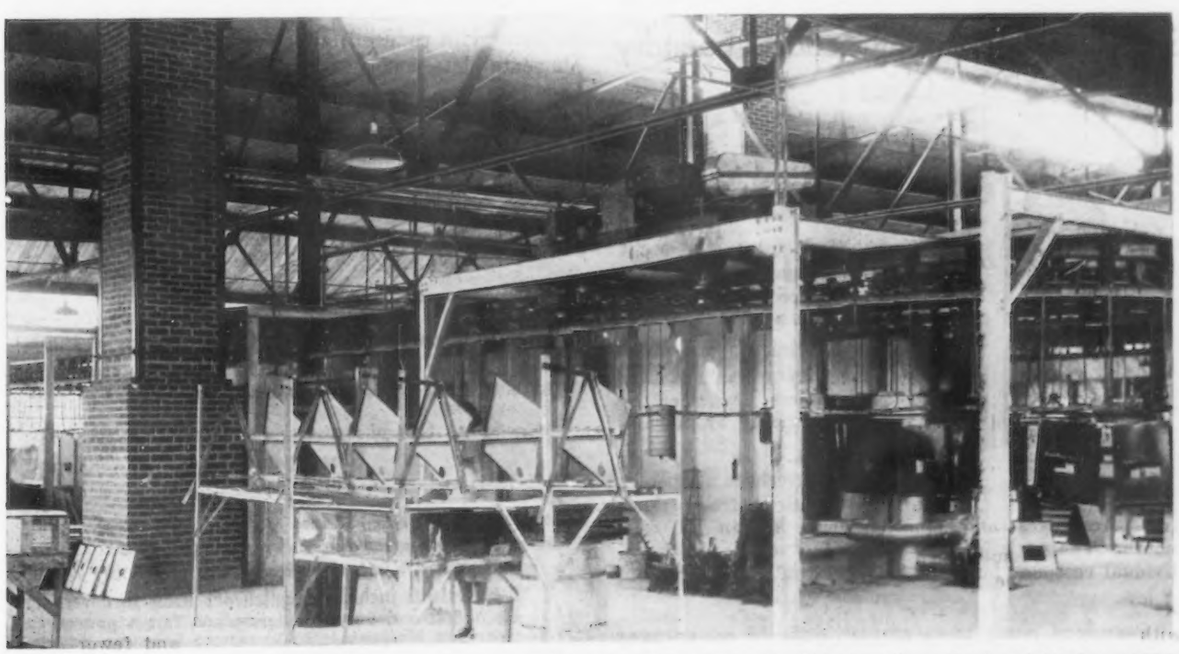
(*Concluded from page* 17)

This air is forced over the opening in a curtain and is sucked into other ducts, with hoods just above the openings, to be exhausted into the stacks.

### How the Process Proceeds

OPERATION of this unit is as follows: The ground coat is dipped on in tanks, and the work hung on the conveyor, which carries it through the dryer and then the furnace, where the enamel is burned on at 1620 deg. F., the burning period being 3½ min. As it emerges from the furnace an operator removes the work, sorts it out according to the color coat it is next to receive and places it on trucks.

These trucks are rolled around to the opposite end of the other conveyor and the parts are hung on the tools. The work is sprayed, as it passes through the spray booths, with the first white coat, which is dried in the dryer. As it emerges from the dryer operators remove the ware, brush the dried enamel



Work passing from the dryer into the furnace on its ways to the hot zone, where the enamel will be burned on. Stack at left takes exhaust from dryer.

from the edges and replace it on the conveyor, which carries it through the second side of the furnace.

When the work comes out of the furnace it is sprayed with the second coat, dried, brushed and is carried through the furnace again. These two coats are vitrified at 1520 and 1540 deg. F. respectively, and the time consumed in burning is 2½ min. each. The hot work from the high-heat zone, traveling parallel and close to the cold work entering, gives up a large portion of its heat to the cold work. The cold work is preheated, in this manner, with great economy in fuel utilization. This is the counterflow principle.

Temperature controls in the firing system maintain the desired temperature automatically, and without the attention of an operator. Recording pyrometers keep accurate charts of all fluctuations in temperature. All colors are used in this work and the furnace temperatures and burning periods are regulated to suit.

One unique device used in this plant is a machine for giving the enameled steel sheets a wood-grain finish. This consists of a 14-in. steel roll, 4 ft. long, covered an inch deep with rubber, the surface of which carries the grain imprint. This sets above a table so that the sheets can be passed between and receive the graining as the roll moves over them.

Ink is fed on to this roll by a series of small rolls, one of which is partially submerged in a trough of ink, the liquid being transferred from one roll to the other and finally to the large roll, by rolling contact only. To obtain a grain finish the work first receives the ground coat, which is burned on. It then receives a coat of walnut colored enamel, which is dried in the dryer, brushed and grained and then burned on.

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## Scientific Rate Setting Reduces Foundry Costs

(*Concluded from page* 11)

latter are handled as follows:

1. Metal at the spout —variations from standard price per 100, drawn off once a month.

2. Direct labor—variations from standard time allowances drawn off by pay periods, by departments.

3. Overhead expenses —variations from standard percentages and tonnage units, drawn off each month. The variations are treated not as charges to individual castings, but rather as items of operating profit or loss.

Standard costs have certain definite advantages in a foundry. They are more accurate than figures built up through day-to-day timekeeping. The clerical labor involved in maintaining the system is much lower than under order costs. The costs are known before the castings are produced.

In jobbing foundries estimating is an outstanding problem. It has all of the difficulties of the cost finding problem, together with the added difficulty that the estimate must be made before the goods are produced. The greatest problem is in determining the time required to perform the direct labor operations. However, if the estimator is working from the same basic data as the rate setter, the estimated labor costs will agree with the rates established in the plant. Again, if the estimator is using the same cost per pound for metal, and percentages and tonnage rates for overhead, the other elements in the computation will conform with those compiled by the cost department, provided the cost department uses standardized rates.

### Estimate and Actual Cost Should Agree

Briefly, then, the estimate should agree with the actual cost if order costs are used. If standard costs are used, the estimate becomes the standard cost and no further calculations are made, so far as individual castings are concerned.

Of vital importance to the foundry is the minimizing and control of direct labor costs by the use of fundamental data established through elementary time studies. In day-work foundries this should be the basis for wage incentive systems; in piece work foundries as a means of equalizing and reducing unscientific rates, thus placing reliance for labor control on scientific data as against mere judgment. Employment of these fundamental data in connection with standard cost finding is of less importance. However, in many cases standard costs minimize clerical effort and at the same time increase the accuracy and value of cost information. In jobbing foundries it is impossible to over-emphasize the necessity for accurate estimating, which goes hand in hand with reduced labor costs. This type of fundamental data makes exact estimating possible. Scientific rate setting, viewed from the standpoint of labor control and in the light of its statistical value, is of prime importance in foundry operations.

**ELEMENTS IN FLOOR MOLDING**

| | |
|---|---|
| Level floor | Roll over |
| Place bottom board | Remove clamp and board |
| Place drag | Make joint |
| Strike off | Place cope |
| Place board | Remove cope |
| Clamp | Close mold |

*Unit of measure: Area of top of flask (by class of joint).*

Place pattern. *Unit of measure: Per piece (by class).*

Shovel and ram. *Unit of measure: Cubic inches of sand (by class).*

Set gaggers. *Unit of measure: Per piece.*

Draw pattern
Finish
Blacken

*Unit of measure: Area of pattern (by class).*

Set cores. *Unit of measure: Per piece (by class).*

Final clamping. *Unit of measure: Per clamp (by class).*

Other elements include miscellaneous items to cover the following: Bolt and unbolt bottom plate; fasten pattern to cope; dry wet blackening; build runner box; rap pattern through cope; draw pattern pins; set nails; place wedges between cope bar and core print; carry off vent with rod, clay and cinders, etc.

# Reversal of Sentiment Fosters Hope for Improvement

**DECLINE in Operations Unchecked, But Buying Interest Is Reviving—Steel Scrap Higher at Pittsburgh — Sheets Advanced**

ALTHOUGH the seasonal downward trend in steel operations is unchecked, the week brought a sufficient revival of buying interest to suggest that the successful outcome of the proposed international debt suspensions might well mark the end of the long decline and possibly the beginning of at least a moderate turn for the better.

The reversal of business sentiment, following the announcement of President Hoover's moratorium plan, has not had a widespread effect upon the orders of the rank and file of steel buyers, but it has brought renewed life to a number of large projects that have been dormant for months.

Notwithstanding the possibility of further favorable developments, the steel industry can scarcely escape at least another month of very low operations. The average rate this week for the entire country is not above 35 per cent of capacity, without considering the loss of output incident to the shutdowns over the holiday. In only one district, Cleveland, has steel production gained. Elsewhere, it has lost further ground or is barely holding its own.

Some of the smaller steel plants will be closed for periods of one or two weeks, or perhaps longer, during July, and a few of the larger interests are concentrating work at their efficient plants in cost-saving efforts. One of the medium-sized companies is staggering its activities by one week of work followed by a week of idleness.

MANY industrial consumers of steel have announced July shutdowns of two weeks, giving their employees a vacation en masse. Nearly all of the automobile plants will suspend activities for two weeks for vacations and inventories between July 15 and Aug. 15. June output of motor cars is not expected to be above 270,000 units, against 315,115 in May, and a further drop indicated for July. Steel orders from the automobile industry continue to decline.

Railroads, on the other hand, perhaps stimulated by the hope of an advance in freight rates, have been ordering a little more freely, although the steel tonnage from this source is still far below normal. With the exception of one company, the steel industry has entered no formal protest against the proposed freight rate rise, many units of the industry believing that the increased buying power of the railroads will offset any disadvantages. Moreover, it is expected that higher freight rates will add strength to the steel price structure.

Outstanding railroad orders are 10,000 tons of rails bought by the Union Pacific and 9000 tons of rails and 7000 tons of tie plates for the Seaboard Air Line. The Norfolk & Western will open bids July 8 on 20,000 tons of rails and the necessary track fastenings.

Although some dormant pipe line projects may be revived if the general business situation improves, the only immediately prospective order is 25,000 tons of 20-in. pipe for the Lycoming Natural Gas Co. for a Pennsylvania-New York State line, which may be placed this week.

THE arrival of the third quarter has been accompanied by a relatively small amount of steel contracting. Except for sheets and hot-rolled strip steel, prices are unchanged. All mills are now quoting the new base prices on sheets, which are up as much as $5 a ton on some grades. The tonnage that buyers specified against lower-priced second quarter contracts was not large, considering the sharp advance in prices, their attitude being that they would prefer to run the risk of paying more later on than to lay in stocks beyond present needs. Third quarter hot-rolled strip contracts have been made at a $1 a ton advance over recent quotations.

Pig iron buying has shown a slight spurt in some districts. Further curtailment in blast furnace activity is in prospect. On a small amount of buying, steel scrap has turned stronger at Pittsburgh, raising THE IRON AGE composite price to $9.17 from $9.08 a week ago, the first advance since February.

OF possibly stimulating effect upon steel prices is the marked activity and price advances in nonferrous metals. Export sales of copper in June, at about 77,000 tons, were the largest for any month in more than a year, while domestic sales in the month were fully 95,000 tons. The domestic copper price has risen to 9c. a lb., delivered. Tin, lead and zinc have all advanced on large buying.

THE IRON AGE composite price of finished steel has advanced from 2.102c. a lb. to 2.137c., based on revised sheet quotations, and is now only slightly below the high of 1931, 2.142c. recorded in January. The pig iron composite has declined from $15.63 to $15.59, the lowest figure since November, 1915.

# PITTSBURGH

## Current Production Perhaps Under Demand with Prices Not Under Pressure

PITTSBURGH, June 30.—The close of the first half of the year finds the Pittsburgh steel industry undergoing the most severe tests which have been encountered since the business depression began nearly two years ago. While comparisons with past experience hold little encouragement to the current situation, it might be pointed out that production, which seems to be approaching bottom, is still well above the minimum levels reached in 1921, in spite of the fact that productive capacity has been greatly enlarged since that time. At the same time curtailment in mill operations during the last month has been even more pronounced than current conditions might warrant in an effort to reduce raw and finished steel stocks to a minimum.

Blast furnace activity in this district is considerably lower than was the case during December, and aggregate stocks of cold iron are no longer accumulating, excepting at one or two plants, which are forced to run their furnaces because of by-product coke capacity. Open-hearth production is fairly steady at present low levels, and probably will not be reduced much further except by possible fortnight suspensions of activity at one or two points. A few smaller companies may suspend operations for an even longer period, and this expedient is being adopted by some of the larger interests, which wish to reduce costs by concentrating production in their more efficient units.

Steel ingot operations in the Pittsburgh district this week average about 35 per cent of capacity, with one large independent company running at a slightly higher rate. The Wheeling district is engaged at about 45 per cent, while output in the Valleys averages 35 to 40 per cent. Production during July may fall a bit lower as operations are expected to be spotty throughout the district. Companies producing large tonnages of line pipe, structural steel and tin plate will be able to sustain operations somewhat better than others, but their gains in raw steel requirements will be partially offset by seasonal inactivity in other lines.

Efforts of sheet makers to establish new price schedules have culminated this week in a withdrawal on July 1 of all lower prices, with business taken for shipment after Aug. 1 to bring the higher schedules. Some consumers of sheets are backing up producers in attempting to stabilize their market, and the prospect of price stabilization after shipments have been completed against present low-priced orders has not been better for a long time. Hot-rolled strip prices are also $1 a ton higher, with many large consumers paying the higher levels. On other finished steel products, second-quarter quotations have been extended in the forthcoming three-month period, and little price difficulty has been encountered.

▲ ▲ ▲

**Steel making operations are holding at last week's level of 35 per cent of capacity.**

* * *

**Production in July will probably average lower because of holiday and irregular spotty suspensions.**

* * *

**Scrap market is showing strength.**

* * *

**New price schedule for sheets is now in force.**

* * *

**Stocks of cold pig iron at furnaces have about ceased to accumulate.**

▼ ▼ ▼

Mixed tendencies are in evidence in the raw materials market. The premium grades of foundry coke have been reduced to $4.50 a net ton, Connellsville, after having held at $4.75 to $4.85 for several years. Furnace coke is unchanged, but coal prices seem to be stronger because of labor troubles, and slack is bringing the highest prices in several months. Scrap is stronger, following sales at $10 two weeks ago, which established record low levels. A small purchase of special steel has raised the market 25c. a ton, with the strength reflected also in hydraulic bundles and rails.

### PIG IRON

No activity has developed in the pig iron market, and buyers have shown no interest in their third-quarter requirements. Most of them prefer to purchase iron on a month-to-month basis, and with foundries in the district averaging no more than two days a week in operations, their requirements are very light. Prices on foundry, malleable and Bessemer iron are fairly well maintained in the absence of tonnage buying. While any large inquiry would undoubtedly bring out concessions, sellers are having little difficulty getting $17, Valley, on current small lots. The Pittsburgh furnace price continues at $17.50. On basic iron quotations are nominal at $15.50 to $16, Valley furnace. Some sellers are still asking $17 for small lots.

*Prices per gross ton, f.o.b. Valley furnace:*

| | |
|---|---|
| Basic | $15.50 to $16.00 |
| Bessemer | 17.00 |
| Gray forge | 16.50 |
| No. 2 foundry | 17.00 |
| No. 3 foundry | 16.50 |
| Malleable | 17.00 |
| Low phos., copper free | 26.66 to 27.00 |

Freight rate to Pittsburgh or Cleveland district, $1.76.

*Prices per gross ton f.o.b. Pittsburgh district furnace:*

| | |
|---|---|
| Basic | $16.00 to $16.50 |
| No. 2 foundry | 17.50 |
| No. 3 foundry | 17.00 |
| Malleable | 17.50 |
| Bessemer | 17.50 |

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

### SEMI-FINISHED STEEL

This market has reflected no increase in activity. No quarterly contracting is reported. Occasional spot orders are bringing $29 to $30, Pittsburgh or Youngstown, for billets, slabs and sheet bars. On forging billets, usual buyers have placed their third quarter business at $35, Pittsburgh. Wire rods are well maintained at the same figure, and some contract tonnage has been booked.

### RAILS AND TRACK SUPPLIES

The Norfolk & Western will take bids on July 8 on 20,000 tons of rails, and is expected to make inquiry in the near future for the required track fastenings. No other business of importance is before the trade, and quarterly buying of track supplies by the carriers has been much lighter than usual this year. Operations are gradually declining, and shipments of both rails and fastenings during July will be very light. It is even reported that the local rail mill may suspend operations for a time during the summer.

### BOLTS, NUTS AND RIVETS

Makers of bolts and nuts have revised prices downward by the granting of an extra 10 per cent discount in addition to the 73 per cent figure which has stood for some time. Third quarter contracts will be revised to comply with this change. No change in small rivet prices is contemplated, and large rivets are still quoted at $2.75 a 100 lb., Pittsburgh. Releases are very light, and the bolt and nut industry is not engaged at more than 25 per cent of capacity.

### BARS, PLATES AND SHAPES

Little significant tonnage in structural shapes and reinforcing bars has been booked by local fabricators in the last week, although some inquiry is still before the trade. Bids will be taken on July 21 on the South Tenth Street bridge at Pittsburgh, which will require 4300 tons of shapes. The remainder of pending work is made up largely of small jobs, which total to a fair tonnage. The barge business is quiet, and no new inquiry is reported. Railroad equipment builders in the district have booked some business in the last week or two which

# A Comparison of Prices

**Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics**

| **Pig Iron,** Per Gross Ton: | June 30, 1931 | June 23, 1931 | June 2, 1931 | July 1, 1930 |
|---|---|---|---|---|
| No. 2 fdy., Philadelphia | *$17.01* | $17.26 | $17.26 | $19.76 |
| No. 2, Valley furnace | 17.00 | 17.00 | 17.00 | 18.50 |
| No. 2 Southern, Cin'ti | 14.69 | 14.69 | 14.69 | 16.69 |
| No. 2, Birmingham | 12.00 | 12.00 | 12.00 | 14.00 |
| No. 2 foundry, Chicago* | 17.50 | 17.50 | 17.50 | 18.00 |
| Basic, del'd eastern Pa | 17.00 | 17.00 | 17.00 | 18.75 |
| Basic, Valley furnace | 15.50 | 15.50 | 15.50 | 18.50 |
| Valley Bessemer, del'd P'gh | 18.76 | 18.76 | 18.76 | 20.76 |
| Malleable, Chicago* | 17.50 | 17.50 | 17.50 | 18.00 |
| Malleable, Valley | 17.00 | 17.00 | 17.00 | 19.00 |
| L. S. charcoal, Chicago | 25.04 | 25.04 | 25.04 | 27.04 |
| Ferromanganese, furnace | †85.00 | †85.00 | †85.00 | 94.00 |

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Ferromanganese quotations adjusted to carload unit; larger quantities sold at discounts.

| **Rails, Billets, etc.,** Per Gross Ton: | June 30, 1931 | June 23, 1931 | June 2, 1931 | July 1, 1930 |
|---|---|---|---|---|
| Rails, heavy, at mill | $43.00 | $43.00 | $43.00 | $43.00 |
| Light rails at mill | 34.00 | 34.00 | 34.00 | 36.00 |
| Rerolling billets, Pittsburgh | 29.00 | 29.00 | 29.00 | 31.00 |
| Sheet bars, Pittsburgh | 29.00 | 29.00 | 29.00 | 31.00 |
| Slabs, Pittsburgh | 29.00 | 29.00 | 29.00 | 31.00 |
| Forging billets, Pittsburgh | 35.00 | 35.00 | 35.00 | 36.00 |
| Wire rods, Pittsburgh | 35.00 | 35.00 | 35.00 | 36.00 |
| | Cents | Cents | Cents | Cents |
| Skelp, grvd. steel, P'gh, lb | 1.65 | 1.65 | 1.65 | 1.70 |

| **Finished Steel,** *Per Lb. to Large Buyers:* | Cents | Cents | Cents | Cents |
|---|---|---|---|---|
| Bars, Pittsburgh | 1.65 | 1.65 | 1.65 | 1.65 |
| Bars, Chicago | 1.70 | 1.70 | 1.70 | 1.75 |
| Bars, Cleveland | 1.65 | 1.65 | 1.65 | 1.75 |
| Bars, New York | 1.98 | 1.98 | 1.98 | 1.98 |
| Tank plates, Pittsburgh | 1.65 | 1.65 | 1.65 | 1.65 |
| Tank plates, Chicago | 1.70 | 1.70 | 1.70 | 1.75 |
| Tank plates, New York | 1.93 | 1.93 | 1.93 | 1.93 |
| Structural shapes, Pittsburgh | 1.65 | 1.65 | 1.65 | 1.65 |
| Structural shapes, Chicago | 1.70 | 1.70 | 1.70 | 1.75 |
| Structural shapes, New York | 1.90½ | 1.90½ | 1.90½ | 1.90½ |
| Cold-finished bars, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Hot-rolled strips, Pittsburgh | 1.55 | 1.55 | 1.55 | 1.65 |
| Cold-rolled strips, Pittsburgh | 2.15 | 2.15 | 2.15 | 2.45 |

| **Finished Steel,** *Per Lb. to Large Buyers:* | June 30, 1931 Cents | June 23, 1931 Cents | June 2, 1931 Cents | July 1, 1930 Cents |
|---|---|---|---|---|
| Hot-rolled annealed sheets, No. 24, P'gh | **2.40** | 2.15 | 2.15 | 2.55 |
| Hot-rolled annealed sheets, No. 24, Chicago dist. mill | **2.50** | 2.35 | 2.35 | 2.65 |
| Sheets, galv., No. 24, P'gh | **2.90** | 2.70 | 2.80 | 3.15 |
| Sheets, galv., No. 24, Chicago dist. mill | **3.00** | 2.85 | 2.90 | 3.25 |
| Hot-rolled sheets, No. 10 | 1.70 | ... | ... | ... |
| Hot-rolled sheets, No. 10 | 1.80 | ... | ... | ... |
| Wire nails, Pittsburgh | 1.80 | 1.80 | 1.80 | 2.05 |
| Wire nails, Chicago dist. mill | 1.85 | 1.85 | 1.95 | 2.15 |
| Plain wire, Pittsburgh | 2.20 | 2.20 | 2.20 | 2.30 |
| Plain wire, Chicago dist. mill | 2.25 | 2.25 | 2.25 | 2.35 |
| Barbed wire, galv., P'gh | 2.55 | 2.55 | 2.55 | 2.80 |
| Barbed wire, galv., Chicago dist. mill | 2.60 | 2.60 | 2.60 | 2.85 |
| Tin plate, 100 lb. box, P'gh | $5.00 | $5.00 | $5.00 | $5.25 |

| **Old Material,** Per Gross Ton: | | | | |
|---|---|---|---|---|
| Heavy melting steel, P'gh | **$10.25** | $10.00 | $10.75 | $14.75 |
| Heavy melting steel, Phila | 8.50 | 8.50 | 9.50 | 12.50 |
| Heavy melting steel, Ch'go | 8.75 | 8.75 | 8.75 | 12.00 |
| Carwheels, Chicago | 10.00 | 10.00 | 10.00 | 13.50 |
| Carwheels, Philadelphia | 12.00 | 12.00 | 12.00 | 14.50 |
| No. 1 cast, Pittsburgh | 10.25 | 10.25 | 10.25 | 13.50 |
| No. 1 cast, Philadelphia | 11.50 | 11.50 | 11.50 | 13.00 |
| No. 1 cast, Ch'go (net ton) | 9.00 | 9.00 | 9.00 | 12.00 |
| No. 1 RR. wrot., Phila | 10.00 | 10.00 | 11.00 | 15.00 |
| No. 1 RR. wrot., Ch'go (net) | 7.00 | 7.00 | 7.50 | 10.00 |

| **Coke, Connellsville,** Per Net Ton at Oven: | | | | |
|---|---|---|---|---|
| Furnace coke, prompt | $2.40 | $2.40 | $2.40 | $2.50 |
| Foundry coke, prompt | 3.50 | 3.50 | 3.50 | 3.50 |

| **Metals,** *Per Lb. to Large Buyers:* | Cents | Cents | Cents | Cents |
|---|---|---|---|---|
| Lake copper, New York | **9.12½** | 8.37½ | 8.62½ | 12.12½ |
| Electrolytic copper, refinery | **8.75** | 8.00 | 8.25 | 11.75 |
| Tin (Straits), New York | **25.20** | 23.95 | 22.45 | 30.05 |
| Zinc, East St. Louis | **3.90** | 3.50 | 3.25 | 4.10 |
| Zinc, New York | **4.25** | 3.85 | 3.60 | 4.45 |
| Lead, St. Louis | **4.22½** | 2.97½ | 3.60 | 5.15 |
| Lead, New York | **4.40** | 4.15 | 3.75 | 5.25 |
| Antimony (Asiatic), N. Y. | **7.05** | 6.25 | 6.30 | 7.00 |

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

will improve plate tonnage. Fabricators of steel tanks are taking a little business from the east Texas oil fields. With the exception of reinforcing bars, the bar market is very quiet, as shipments to the automobile industry are off and miscellaneous consumers are ordering only in small lots. The New York Central Railroad took bids this week on its third quarter steel requirements, involving tonnages of all the heavy hot-rolled products. Mills in this district generally quoted 1.65c., Pittsburgh, which they consider the market on bars, plates and shapes. No effort is being made to get higher prices, and producers have had little difficulty thus far in renewing old contracts at the prices which prevailed in the second quarter.

## COLD-FINISHED STEEL BARS

With the exception of a small amount of third quarter contracting, this market has been very quiet in the last week. June shipments have been well under those of May, and the July movement probably will be even smaller. The price of 2.10c., Pittsburgh, appears to be well maintained.

## TUBULAR GOODS

The inquiry of the Lycoming Natural Gas Co. for a gas line from the Tioga, Pa., fields to Syracuse and other New York cities is the center of interest in the line pipe market. This line would take about 25,000 tons of 20-in. pipe, which two of the larger pipe makers are not in a position to furnish. Some smaller tonnages of pipe for feeder lines have been placed in the last week. No new inquiry has developed, and some pending tonnage which had been considered active may now be postponed until next season. Seamless mills in the district are running at a good rate, but backlogs will not last through the month. Butt-weld capacity is about 25 per cent active and lapweld much less. A fair demand for oil country casing for the east Texas fields continues, but there is little business from other sections. Mechanical tubing is very dull and boiler tubes slightly better.

## WIRE PRODUCTS

Orders for merchant wire products from jobbers have been slightly heavier in the last week. Some third quarter contracts have been taken by producers, but prices are weak and consumers are not showing much interest in future requirements. Manufacturers' wire is quiet, but the price is well maintained at 2.20c., Pittsburgh. Nails are unchanged at $1.80, Pittsburgh, to jobbers, with a few makers trying to get $1.90 on small lots.

## SHEETS

Following a week or two of rather strenuous competition for July tonnage, sheet makers generally are adhering to the new price schedules announced earlier in the year. These call for advances of $1 to $5 a ton on all the principal grades of sheets. Galvanized sheets are now quoted at 2.90c., Pittsburgh; black sheets, now designated as hot-rolled annealed sheets, at 2.40c., and automobile body stock at 3.10c. Continuous mill sheets, now designated as hot-rolled sheets, No. 10 gage, are unchanged at 1.70c., Pittsburgh. These prices are to apply on all business taken after July 1, and all tonnage booked at the old prices must be shipped prior to Aug. 1. Tonnage booked recently for July shipment established record low prices on sheet steel in general, and mills

## THE IRON AGE COMPOSITE PRICES

| | Finished Steel | Pig Iron | Steel Scrap |
|---|---|---|---|
| June 30, 1931 | 2.137c. a Lb. | $15.59 a Gross Ton | $9.17 a Gross Ton |
| One week ago | 2.102c. | 15.63 | 9.08 |
| One month ago | 2.102c. | 15.63 | 9.67 |
| One year ago | 2.185c. | 17.42 | 13.08 |
| | Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output. | Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham. | Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago. |

| | Finished Steel High | Finished Steel Low | Pig Iron High | Pig Iron Low | Steel Scrap High | Steel Scrap Low |
|---|---|---|---|---|---|---|
| 1931 | 2.142c., Jan. 13 | 2.102c., June 2 | $15.90, Jan. 6 | $15.59, June 30 | $11.33, Jan. 6 | $9.08, June 23 |
| 1930 | 2.362c., Jan. 7 | 2.121c., Dec. 9 | 18.21, Jan. 7 | 15.90, Dec. 16 | 15.00, Feb. 18 | 11.25, Dec. 9 |
| 1929 | 2.412c., April 2 | 2.362c., Oct. 29 | 18.71, May 14 | 18.21, Dec. 17 | 17.58, Jan. 29 | 14.08, Dec. 3 |
| 1928 | 2.391c., Dec. 11 | 2.314c., Jan. 3 | 18.59, Nov. 27 | 17.04, July 24 | 16.50, Dec. 31 | 13.08, July 2 |
| 1927 | 2.453c., Jan. 4 | 2.293c., Oct. 25 | 19.71, Jan. 4 | 17.54, Nov. 1 | 15.25, Jan. 11 | 13.08, Nov. 22 |
| 1926 | 2.453c., Jan. 5 | 2.403c., May 18 | 21.54, Jan. 5 | 19.46, July 13 | 17.25, Jan. 5 | 14.00, June 1 |
| 1925 | 2.560c., Jan. 6 | 2.396c., Aug. 18 | 22.50, Jan. 13 | 18.96, July 7 | 20.83, Jan. 13 | 15.08, May 5 |

were able to drive in some tonnage at such figures. As a result, the past week was fairly good from a tonnage standpoint and producers may be able to maintain operations on a par with those of June in spite of the usual summer lull in demand. Present schedules range from 30 to 35 per cent of capacity.

### TIN PLATE

Hot weather throughout the country has stimulated the canning industry on some crops, particularly peas, and mills in this district have been called on for rather heavy tin plate shipments in the last week. Production has not increased, but is well maintained at about 65 per cent of capacity. Specifications for July shipment are satisfactory and the month is expected to compare favorably with June from that standpoint.

### STRIP STEEL

Current releases have shown little change, but orders for future delivery have been somewhat more encouraging in the last week. Mills have taken a substantial number of third quarter contracts for hot-rolled strip at 1.65c. and 1.55c., Pittsburgh, for the narrow and wider sizes, respectively, representing advances of $1 a ton over recent quotations. The higher figures are being quoted rather generally and the current market is rapidly being established at those levels. Cold-rolled strip is also better maintained at 2.15c., Pittsburgh.

### WAREHOUSE BUSINESS

Local warehouses have reduced prices on cold-finished and screw stock 25c. a 100 lb. Rounds and hexagons are now quoted at 3.10c. a lb. and squares and flats at 3.60c. No other price changes are reported, but shading is common on some products, particularly wire nails. A low price is expected on bolts and nuts to conform with prospective reductions by makers.

### COAL AND COKE

Makers of the premium grades of foundry coke, who have been selling at $4.75 and $4.85 for several years, have reduced their prices to $4.50 per ton, Connellsville, for shipment in open top cars, while box car shipments will take the usual 25c. advance. This price reduction is rather unusual in view of the tendency toward firmer prices in coal, but the premium coke makers anticipate no labor trouble. Prices on ordinary foundry coke ordinarily range from $3.25 to $3.50, while the furnace grade continues at $2.40, Connellsville. Firmer prices on some grades of coal are reported in western Pennsylvania, and slack is definitely stronger with sales at $1.25 a ton reported on both the gas and steam grades. Some grades of coal are rather difficult to buy, and prices generally are firmer.

### OLD MATERIAL

Purchase of a comparatively small tonnage of a special grade of railroad heavy melting steel by a small mill in the Pittsburgh district at $11 reflects the strengthening tendency of scrap prices. Two dealers shared in the purchase, and even though the scrap bought would easily command a premium of 50c. over the regular market on heavy melting steel, the market may again be quoted at $10 to $10.50, an advance of 25c. a ton over the low level reached last week. Hydraulic compressed sheets and rails are also stronger, particularly sheets. Dealers who had the privilege of shipping hydraulic bundles at $9.50 or steel at $10 on a recent sale have not been able to secure bundles at such a low price and have been shipping steel instead. Under the circumstances bundles may be quoted at $9.50 to $10, even though this figure is largely nominal and hardly represents the price at which mills might be able to buy today. No changes are reported in the other grades of scrap and considerable interest is attached to the railroad lists closing today.

### Warehouse Prices, f.o.b. Pittsburgh

| | *Base per Lb. |
|---|---|
| Plates | 2.85c. |
| Structural shapes | 2.85c. |
| Soft steel bars and small shapes | 2.60c. |
| Reinforcing steel bars | 2.60c. |
| Cold-finished and screw stock— | |
| Rounds and hexagons | 3.10c. |
| Squares and flats | 3.60c. |
| Bands | 2.95c. |
| Hoops | 3.95c. |
| Black sheets (No. 24), 25 or more bundles | 3.05c. |
| Galv. sheets (No. 24), 25 or more bundles | 3.40c. |
| Light plates, blue annealed (No. 10) | 3.10c. |
| Blue annealed sheets (No. 13) | 3.25c. |
| Galv. corrug. sheets (No. 28), per square (less than 3750 lb.) | 3.74c. |
| Spikes, large | 2.65c. |
| Small | 2.90c. to 3.05c. |
| Boat | 3.15c. |
| Track bolts, all sizes, per 100 count, 60 and 10 per cent off list | |
| Machine bolts, 100 count, 60 and 10 per cent off list | |
| Carriage bolts, 100 count, 60 and 10 per cent off list | |
| Nuts, all styles, 100 count, 60 and 10 per cent off list | |
| Large rivets, base per 100 lb | $3.20 |
| Wire, black, soft ann'l'd, base per 100 lb. | 2.30 |
| Wire, galv. soft, base per 100 lb | 2.75 |
| Common wire nails, per keg | 2.05 |
| Cement coated nails, per keg | 2.05 |

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 999 lb.

*Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:*

| | | |
|---|---|---|
| **Basic Open-Hearth Grades:** | | |
| No. 1 heavy melting steel | $10.00 to | $10.50 |
| No. 2 heavy melting steel | 9.25 to | 9.75 |
| Scrap rails | 9.50 to | 10.00 |
| Compressed sheet steel | 9.50 to | 10.00 |
| Bundled sheets, sides and ends | 8.00 to | 8.50 |
| Cast iron carwheels | 10.50 to | 11.00 |
| Sheet bar crops, ordinary | 11.00 to | 11.50 |
| Heavy breakable cast | 8.00 to | 8.50 |
| No. 2 railroad wrought | 9.75 to | 10.25 |
| Hvy. steel axle turnings | 9.00 to | 9.50 |
| Machine shop turnings | 6.50 to | 7.00 |
| **Acid Open-Hearth Grades:** | | |
| Railr. knuckles and couplers | 12.50 to | 13.00 |
| Railr. coil and leaf springs | 12.50 to | 13.00 |
| Rolled steel wheels | 12.50 to | 13.00 |
| Low phos. billet and bloom ends | 14.50 to | 15.00 |
| Low phos. mill plates | 12.00 to | 12.50 |
| Low phos. light grades | 12.00 to | 12.50 |
| Low phos. sheet bar crops | 13.00 to | 13.50 |
| Heavy steel axle turnings | 9.00 to | 9.50 |
| **Electric Furnace Grades:** | | |
| Low phos. punchings | 13.50 to | 14.00 |
| Heavy steel axle turnings | 9.00 to | 9.50 |
| **Blast Furnace Grades:** | | |
| Short shoveling steel turnings | 6.75 to | 7.25 |
| Short mixed borings and turnings | 6.75 to | 7.25 |
| Cast iron borings | 6.75 to | 7.25 |
| **Rolling Mill Grades:** | | |
| Steel car axles | 16.50 to | 17.50 |
| **Cupola Grades:** | | |
| No 1 cast | 10.00 to | 10.50 |
| Rails 3 ft. and under | 12.50 to | 13.00 |

# CHICAGO

## Steel Ingot Output Drops Below 35 Per Cent of Capacity

CHICAGO, June 30.—A combination of circumstances has lowered ingot production in this district to less than 35 per cent of capacity, and in all probability output will drop to 30 per cent near the end of the week. Illinois Steel Co. has banked the one blast furnace it has been operating at Joliet and it will not be brought back into service until after the Fourth of July. There are now active 10 of 36 steel mill stacks.

The circumstances that have brought about curtailment in production are varied. First, there is the mid-year inventory period, which is being extended in many cases to two weeks, and workers are being given their vacations en masse. Then, as another factor, practically all major consuming industries are experiencing the usual drop in summer volume of business. Rather an unexpected influence in the market at the moment is a protracted heat spell that has held the Middle West in its grip for about two weeks. Efficiency of all classes of workers is being cut, and buyers are far less aggressive than during normal summer temperatures.

Fairly satisfactory progress is being made by car shops in preparing to manufacture against recent orders. Shipments of car materials are holding to the recent gain, and additional materials are being negotiated. Bids for the Chicago Post Office will be opened Aug. 10. This is a $14,000,000 project that will require close to 50,000 tons of steel. In general, the structural market is quiet, with most interest centering in a few inquiries that have been out for some time.

Price changes in the iron and steel market are limited in number and, as buying in quantity is lacking, there are few opportunities for real tests.

### FERROALLOYS

This market is dull. Most consumers are carrying stocks that are far below normal for this time of year. Sellers anticipate that pressure for prompt delivery will come at the first sign of industrial improvement.

### PIG IRON

Consumers of Northern foundry iron remain cautious in making known third quarter needs. Notwithstanding this condition, the volume of purchases already exceeds that at the opening of the second quarter. Contracting is exceedingly spotty, due probably to a considerable tonnage that is being carried forward on old contracts. Prices remain steady at $17.50 a ton, local furnaces. Producers are going into the third quarter with large and well rounded stocks and with production limited to three merchant stacks

▲ ▲ ▲

**Steel ingot output may decline to 30 per cent by end of week.**

* * *

**Industrial plant shutdowns, excessive heat and general seasonal decline in consumption affecting steel business.**

* * *

**With banking of furnace at Joliet, only 10 steel mill stacks of 36 in district are active.**

* * *

**Pig iron buyers cautious, though contracting is better than at beginning of second quarter.**

* * *

**Scrap prices register no further declines, though signs of strength are still lacking.**

▼ ▼ ▼

that are not being operated at capacity. Shipments have declined because of the inventory and vacation period, which will extend through most of July.

*Prices per gross ton at Chicago:*

| | |
|---|---|
| N'th'n No. 2 fdy., sil. 1.75 to 2.25 | $17.50 |
| N'th'n No. 1 fdy., sil. 2.25 to 2.75 | 18.00 |
| Malleable, not over 2.25 sil. | 17.50 |
| High phosphorus | 17.50 |
| Lake Super. charcoal, sil. 1.50 | $25.04 to 27.04 |
| S'th'n No. 2 fdy. | 17.01 |
| Low phos., sil. 1 to 2, copper free | 28.50 to 29.20 |
| Silvery, sil. 8 per cent | 24.79 to 26.79 |
| Bess. ferrosilicon, 14-15 per cent | 35.79 |

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including an average switching charge of 61c. per gross ton.

### COLD-ROLLED STRIP

Specifications continue to shrink, and output is not above 18 per cent of capacity for the country as a whole. Prices are steady at 2.15c. a lb., Cleveland.

### HOT-ROLLED STRIP

Sellers in the local market are withdrawing the low prices named recently, and current quotations now are 1.75c. a lb., Chicago, for strips 6 in. and narrower, and 1.65c. for strips wider than 6 in. Demand is spotty and individual orders are small.

### WIRE RODS

Quotations in this district are $36 a ton, or $1 above prices at Pittsburgh. Recent sales of fair tonnages have established the market at the $36 level.

### RAILS AND TRACK SUPPLIES

Output of standard-section rails is well sustained at close to 30 per cent of capacity by releases of upward of 7000 tons. Recent specifications are heavier than those of mid-June, and most tonnages now being called for are for immediate delivery. Railroads are also more liberal in releasing track supplies, and here again there is pressure against mills to make the earliest possible delivery. Strikes in coal producing regions appear to be largely responsible for the deadening of what little light rail business had been coming into the market.

### STRUCTURAL MATERIAL

The local structural market has dropped back to the point where fresh inquiries are of very little moment and interest must of necessity center around a few tonnages that are of somewhat long standing. Word comes from Milwaukee that sentiment is strongly in favor of awarding a 7000-ton viaduct there to Milwaukee fabricators on a cost plus basis. In fact, preliminary official action has already been taken, though the thought has been advanced that it may not be legal to award contracts without first taking competitive bids. The Illinois Waterway Commission is actively engaged in engineering work on a number of bridges that will require a round tonnage of structural material, and the Sanitary District trustees are hurrying plans for enlargement of the Calumet sewage treating plant. Fabricators are looking closely into the matter of shop economies, especially where more than one shop is under one management. The inclination is to concentrate operations in one shop and to close temporarily the other units. Bids by fabricators are still variable and usually low. Mills are holding structural material fairly steady at 1.70c. a lb., Chicago.

### SHEETS

Output is not above 35 per cent of capacity, and probably will drop still further when the holiday is counted in the current week. Small and spotty orders are determining factors and unusually hot weather is cutting down the efficiency of mill workers.

*Base prices per lb., deliv'd from mill in Chicago:* No. 24 black sheets, 2.40c. to 2.50c.; No. 24 galv., 2.95c. to 3.05c.; No. 10 blue ann'l'd, 2.00c. to 2.10c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

### CAST IRON PIPE

The cast iron pipe market has not revived from the dull state reached earlier in the month. Private buying is almost at a standstill, and public inquiries and awards are for the most part in amounts that range downward from 300 tons. James B. Clow & Sons are successful bidders on the pipe for two sewage disposal plants in South

Dakota. One of these, requiring 350 tons, is at Huron, and the other, for which 150 tons will be needed, is at Watertown. At Chicago, there is the promise of a large tonnage for the Sanitary District, which is building an addition to the Calumet sewage plant. Bids are soon to be taken on that portion of the pipe and specials needed for the pumping plant, and about July 16 bids will be opened on a large tonnage for the main portion of the treating plant. Prices are steady in the range from $34 to $36 a ton, Birmingham, in carload lots. The freight to Chicago is $8 a ton. Attempts are being made to bring the minimum on orders of this size to $35, Birmingham.

*Prices per net ton, deliv'd Chicago:* Water pipe, 6-in. and over, $42 to $44; 4-in., $45 to $47; Class A and gas pipe, $3 extra.

## WIRE PRODUCTS

Production continues to ease downward, and output now is not above 30 per cent of capacity. A review of market conditions seems to point to nothing better than this for at least the month of July. Farmers are busily engaged in their fields gathering harvests, which in some sections of the country, notably the Middle West, may not be as heavy as anticipated because of excessively hot and, in some places, dry weather. Many salesmen will be on vacations in July, and therefore active solicitation will be at a low point. Use of wire by automobile manufacturers is lighter and general manufacturing needs are also curtailed.

## BARS

Demand is falling off rather sharply as the mid-year inventory period approaches. Many industrial plants plan shutdowns for the purpose of mass vacations. Mild steel bars that go into concrete reinforcement are moving in fair volume, but there is no activity in iron bars. Use of alloy steel bars is lighter in most directions, with the possible exception of manufacturers of road equipment. Rail steel bar mills are operating with backlogs of 10 to 15 days and with new business extremely spotty.

## PLATES

According to reports recently received here, there has been confusion concerning the likelihood of the Pacific Fruit Express coming into the market for underframes. In any event, no inquiry has been made, according to the best information available. The Fruit Growers Express, which last week ordered 800 underframes from Pressed Steel Car Co. now is said to have plans ready to build 800 new refrigerator cars in its shops at Indiana Harbor. The broader action taken by the railroad equipment market in the last week or two has subsided, and once again this phase of the steel demand offers little news. Local car shops are a little more active, but operators with only a small amount of work ahead of them are cautious in building up organizations. A few speculative tank projects are in the wind, but mills remain rather indifferent because of the method-of-payment strings that are tied to the propositions. The tonnage of plates moving to pipe manufacturers has been quite steady in June, and schedules for early July are well planned. Prices are steady at 1.70c. a lb., Chicago, which seems destined to become the quotation that will be carried into the third quarter.

## BOLTS, NUTS AND RIVETS

Recent announcements of more liberal discounts on some of these commodities have had no effect in stimulating demand. Output some days ago had dropped below 30 per cent of capacity, and is now under that rate for the reason that several important producers in this district have shut down their plants for the first two weeks in July.

## REINFORCING BARS

Price weakness again becomes a characteristic of this market, with awards of several large tonnages. Billet steel reinforcing bars are now quotable 1.55c. to 2c. a lb., warehouse, depending upon the tonnage involved. Fresh inquiries continue to fall behind orders, and it appears more than ever to dealers that the summer months are destined to be very quiet. The Pennsylvania Railroad has ordered 1000 tons for track elevation work and contractors have placed well over 2000 tons of road work bars which are needed for recent Illinois lettings. Another Illinois road letting, which will call for about 3000 tons, is taking shape. Old bids on grade separation work in Wisconsin have been thrown out and the work is being readvertised.

## COKE

Contracting in by-product foundry coke for the last half of the year has made steady progress and commitments have been made by most contract consumers. Prices are steady at $7.50 a ton, local ovens. Shipments in June fell below those of May, and the outlook is that the July movement will go still lower.

### Warehouse Prices, f.o.b. Chicago

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.00c. |
| Soft steel bars | 2.75c. |
| Reinforcing bars, billet steel | 1.55c. to 2.00c. |
| Rail steel reinforcement— | |
| For buildings | 1.45c. to 1.65c. |
| Highway slabs | 1.50c. |
| For bridges and culverts | 1.65c. |
| Cold-fin. steel bars and shafting— | |
| Rounds and hexagons | 3.10c. |
| Flats and squares | 3.60c. |
| Bands, ⅞ in. (in Nos. 10 and 12 gages) | 2.95c. |
| Hoops (No. 14 gage and lighter) | 3.50c. |
| Black sheets (No. 24) | 3.55c. |
| Galv. sheets (No. 24) | 4.10c. |
| Blue ann'l'd sheets (No. 10) | 3.20c. |
| Spikes (⅜ in. and larger) | 3.45c. |
| Track bolts | 4.30c. |
| Rivets, structural | 4.00c. |
| Rivets, boiler | 4.00c. |
| | Per Cent Off List |
| Machine bolts | 60 and 10 |
| Carriage bolts | 60 and 10 |
| Coach and lag screws | 60 and 10 |
| Hot-pressed nuts, sq., tap. or blank, | 60 and 10 |
| Hot-pressed nuts, hex., tap. or blank, | 60 and 10 |
| No. 8 black ann'l'd wire, per 100 lb. | $3.45 |
| Com. wire nails, base per keg | 2.30 |
| Cement c't'd nails, base per keg | 2.30 |

## OLD MATERIAL

A sale of heavy melting steel to a consumer at $9 has tended to stabilize this market when it wavered momentarily following a sale at $8.75 a gross ton, delivered. The sale at the higher price was a strictly No. 1 grade, whereas that which moved at 25c. less was taken by a mill which is less strict in its specifications. It is estimated by some that there is fully 25,000 tons of $9 heavy melting steel outstanding on old orders, and very little of this is covered. Dealers readily pay $8.75, and there are at times indications that it would take very little to put this market on a higher level. Shipments to mills are lighter, not alone because of curtailed use, but in some measure because dealers were crowding shipments too fast. Specialties are moving in very small volume.

*Prices deliv'd Chicago dist. consumers:*

| | Per Gross Ton | |
|---|---|---|
| **Basic Open-Hearth Grades:** | | |
| Heavy melting steel | $8.50 to | $9.00 |
| Shoveling steel | 8.50 to | 9.00 |
| Frogs, switches and guards, cut apart, and misc. rails | 8.50 to | 9.00 |
| Factory hyd. comp. sheets | 7.00 to | 7.50 |
| Drop forge flashings | 6.00 to | 6.50 |
| No. 1 busheling | 6.75 to | 7.25 |
| Forg'd cast and r'l'd steel carwheels | 9.50 to | 10.50 |
| Railroad tires, charg. box size | 10.50 to | 11.00 |
| Railroad leaf springs cut apart | 11.00 to | 11.50 |
| Axle turnings | 7.00 to | 7.50 |
| **Acid Open-Hearth Grades:** | | |
| Steel couplers and knuckles | 9.75 to | 10.25 |
| Coil springs | 11.50 to | 12.00 |
| **Electric Furnace Grades:** | | |
| Axle turnings | 7.50 to | 8.00 |
| Low phos. punchings | 10.75 to | 11.25 |
| Low phos. plates, 12 in. and under | 10.50 to | 11.00 |
| **Blast Furnace Grades:** | | |
| Cast iron borings | 3.75 to | 4.00 |
| Short shoveling turnings | 3.50 to | 4.00 |
| Machine shop turnings | 3.50 to | 4.00 |
| **Rolling Mill Grades:** | | |
| Rerolling rails | 10.25 to | 10.75 |
| **Cupola Grades:** | | |
| Steel rails, less than 3 ft. | 10.50 to | 11.00 |
| Steel rails, less than 2 ft. | 11.00 to | 11.50 |
| Angle bars, steel | 9.25 to | 9.75 |
| Cast iron carwheels | 10.00 to | 10.50 |
| **Malleable Grades:** | | |
| Railroad | 9.50 to | 10.00 |
| Agricultural | 9.00 to | 9.25 |
| **Miscellaneous:** | | |
| *Relaying rails, 56 to 60 lb. | 19.00 to | 21.00 |
| *Relaying rails, 65 lb. and heavier | 22.00 to | 27.00 |
| | *Per Net Ton* | |
| **Rolling Mill Grades:** | | |
| Iron angle and splice bars | 9.00 to | 9.50 |
| Iron arch bars and transoms | 10.50 to | 11.00 |
| Iron car axles | 17.50 to | 18.50 |
| Steel car axles | 11.50 to | 12.00 |
| No. 1 railroad wrought | 7.00 to | 7.50 |
| No. 2 railroad wrought | 7.50 to | 8.00 |
| No. 1 busheling | 6.00 to | 6.50 |
| No. 2 busheling | 4.00 to | 4.50 |
| Locomotive tires, smooth | 11.50 to | 12.50 |
| Pipes and flues | 5.50 to | 6.00 |
| **Cupola Grades:** | | |
| No. 1 machinery cast | 9.00 to | 9.50 |
| No. 1 railroad cast | 8.00 to | 8.50 |
| No. 1 agricultural cast | 7.00 to | 7.50 |
| Stove plate | 6.25 to | 6.75 |
| Grate bars | 5.50 to | 6.00 |
| Brake shoes | 5.50 to | 6.00 |

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

# CLEVELAND

## Demand for Steel Continues to Decline But Ingot Output Is Slightly Higher

CLEVELAND, June 30.—Demand for finished steel continues to show a slight downward tendency, although there was a little spurt the past week in orders for black sheets (now designated as hot-rolled annealed) that was brought about by the price advance that manufacturers feel confident they will make effective July 1. Mills so far apparently are holding firmly to the higher sheet prices, although as yet they have been given little test.

Steel plant operations in Cleveland have been increased six points to 41 per cent of ingot capacity by the putting on of two open-hearth furnaces. Local plants this week are operating 14 of 34 furnaces.

With the third quarter at hand, some consumers are showing a little more interest in making commitments for the heavier rolled steel products, as is indicated by a gain in small-lot inquiry that is reported by one or two mills. These buyers evidently have depleted their stocks to an extent that they must place orders and they have postponed making new purchases until after the start of the quarter.

Demand for steel from the motor car industry continues to lag. Purchases for July requirements by that industry so far have been rather sharply restricted. The construction field is at present the most promising outlet for steel. Local contractors are figuring on considerable work in highway bridges and grade crossing separation work in New York and Ohio and a moderate amount of public building work. It is expected that this demand will be maintained through the summer months. However, July and August are expected to be very dull months for the steel industry as a whole, as consuming industries in the metal-working lines are slack and do not look for any special change in their volume of business during the summer months.

Aside from sheets, the only interest in the price situation is the proposed advance on hot-rolled strip. However, it may be a few weeks before the new price on this is thoroughly tested. Present prices on heavier rolled steel products are being continued through the third quarter, but these are not attracting a great deal of interest.

### PIG IRON

The Westinghouse Electric & Mfg. Co., which sent out an inquiry several weeks ago for pig iron for its Cleveland, Trafford City, Pa., and Attica, N. Y., plants, made its purchases during the week, dividing the business among several furnaces. While the amount bought is not announced, it is understood to have been in excess of 2000 tons. The iron for the Cleveland plant went to local furnaces at their regular $17, furnace, price. With this exception, there was very little activity during the week, sales having been confined to small lots for early needs. An increase in sales is looked for during the latter part of July, as some foundries have stated that they will come in the market at that time. These evidently feel that the low point in the demand will come late in July and that there is a greater possibility of developing weak spots at that time. Shipping orders declined 10 to 15 per cent during June. Demand from the motor car industry continues to decline. Prices are unchanged at $16 to $17, Lake furnace, for foundry and malleable iron for Ohio and Indiana and at $17 to $17.50 for Michigan delivery.

*Prices per gross ton at Cleveland:*

| | |
|---|---|
| N'th'n fdy., sil. 1.75 to 2.25 | $17.00 |
| S'th'n fdy., sil. 1.75 to 2.25 | 17.01 |
| Malleable | 17.50 |
| Ohio silvery, 8 per cent | 25.00 |
| Stand. low phos., Valley | 27.00 |

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; $3 from Jackson, Ohio; $6.01 from Birmingham.

### BARS, PLATES AND SHAPES

Orders for steel bars continue to taper off, largely because of the declining requirements from the motor car industry. Specifications for structural material are holding up fairly well. Reinforcing bars are moderately active. Structural lettings in this territory are light. The Lorain Central Bridge, Cleveland, will require an additional 1400 tons, but this is covered by the original contract. General Electric Co. has placed 500 tons for a building in Erie, Pa. Plates are dull. Present prices are being maintained for the third quarter, although only a few of the mills have formally announced their reestablishment. Consumer interest in the new quarter is lacking. Steel bars are quoted at 1.65c., Cleveland, for outside shipment and at 1.70c., for local delivery, and plates and shapes at 1.65c., Pittsburgh, although on plates 1.60c. might be quoted on a desirable lot.

**Warehouse Prices, f.o.b. Cleveland**

| | Base per Lb. |
|---|---|
| Plates and struc. shapes | 2.95c. |
| Soft steel bars | 2.75c. |
| Reinforc. steel bars | 1.75c. to 1.95c. |
| Cold-fin. rounds and hex | 3.10c. |
| Cold-fin. flats and sq | 3.60c. |
| Hoops and bands, No. 12 to ¼ in., inclusive | 3.00c. |
| Hoops and bands, No. 13 and lighter | 3.55c. |
| Cold-finished strip | *5.55c. |
| Black sheets (No. 24) | 3.60c. |
| Galvanized sheets (No. 24) | 4.00c. |
| Blue ann'l'd sheets (No. 10) | 3.00c. |
| No. 9 ann'l'd wire, per 100 lb | $2.35 |
| No. 9 galv. wire, per 100 lb | 2.80 |
| Com. wire nails, base per keg | 2.25 |

*Net base, including boxing and cutting to length.

### STRIP STEEL

The $1 a ton price advance on hot-rolled strip that the mills will attempt to place in effect July 1 has in a limited way stimulated orders against old contracts taken at 1.50c., Pittsburgh, for wide strip and 1.60c. for narrow. However, the policy of most consumers is to pay the advance if necessary rather than order material that they are not sure of needing. So far there has been little test of the higher prices. Actual demand still shows a downward tendency. Cold-rolled strip is dull. The 2.15c., Cleveland, price is being maintained.

### SHEETS

Orders gained somewhat during the past week, having been stimulated by the naming of June 30 as the deadline for accepting business on the old bases. This business was largely in black sheets and in single-pickled, cold-rolled sheets. Most of the mills will discontinue manufacturing the latter grade. Some fair-sized orders came from barrel manufacturers. Mills report they are meeting with little resistance to the advances provided in the new schedules, which became effective July 1, although very little business has been definitely placed under these schedules. Through today black sheet orders are being taken at 2.15c., Pittsburgh. Mills are accepting orders for shipment to the end of July and some have advised their trade that material not released the coming month will be billed at the higher prices. Galvanized sheets are still spotty, with quotations of 2.70c. reported. There is very little activity in auto body, metal furniture and enameling sheets.

### IRON ORE

Lake Superior ore consumed in May amounted to 2,674,758 tons, a decrease of 150,889 tons for the month. This compares with 4,715,379 tons consumed in May last year. Ore at furnaces June 1 amounted to 21,967,645 tons. The amount in furnace stock piles and at Lake Erie docks on that date was 27,114,747 tons, against 21,324,837 tons on the same date a year ago. Central district furnaces consumed 1,373,514 tons in May, a loss of 69,292 tons for the month. Lake front furnaces melted 1,262,873 tons, a decrease of 71,038 tons. All-rail furnaces used 22,619 tons, a loss of 8025 tons, and Eastern furnaces consumed 15,752 tons, a loss of 2534 tons. There were 90 furnaces using Lake

*(Concluded on page 72)*

# NEW YORK

## Pig Iron Inquiry Slightly More Active—Steel Buying Lags

NEW YORK, June 30.—Prospective pig iron business reflects a fair interest among local melters, total new inquiry amounting to about 3500 tons, involving two 1000-ton lots and a number of 100 to 500 tons each, practically all of which is specified for early delivery. Thatcher Co. will probably close this week on 3000 tons of No. 2 plain iron for third quarter shipment to its Garwood, N. J. plant. Sales for the week aggregated 4500 tons, compared with 3500 tons in the previous week and 2500 tons two weeks ago. Worthington Pump & Machinery Corpn, bought 250 tons for its Harrison, N. J., plant and 100 tons for its Holyoke, Mass., plant. A Connecticut melter is understood to have bought a fair tonnage of malleable iron.

Prices are generally held to schedules on small lots, with some concessions indicated on attractive tonnages. Southern iron is quoted at $11 a ton, Birmingham, for delivery in the local district.

Ford Motor Co. is in the market for 500 tons of ferromanganese and 600 tons of 15 per cent ferrosilicon for third quarter delivery.

*Prices per gross ton, delivered New York district:*

| | |
|---|---|
| Buffalo No. 2 fdy., sil. 1.75 to 2.25 | $19.91 to $20.41 |
| *Buff. No. 2, del'd east. N. J. | 18.28 to 18.78 |
| East. Pa. No. 2 fdy., sil. 1.75 to 2.25 | 17.39 to 17.89 |
| East. Pa. No. 2X fdy., sil. 2.25 to 2.75 | 17.89 to 18.39 |

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

### FINISHED STEEL

The transition from second to third quarter is being made in the local steel market without much more than a ripple of interest among buyers. It is true that some sheet jobbers and consumers specified somewhat more freely against expiring second quarter contracts, but, in the face of the much higher prices that may have to be paid when present supplies and commitments are exhausted, the tonnage that buyers took was less than might have been expected. The attitude of many buyers was that they would prefer to pay more later on, if necessary, than to lay in stocks for which they have no present need. The new sheet prices are being firmly quoted by all producers, but will not be effective on very much business for a few weeks. There has been some third quarter contracting for plates, shapes and bars, but, as there has been no change in price, and, as many second quarter contracts were not taken out in full, the usual procedure has been to extend the old contracts.

Bids were opened by the New York Central Railroad on Monday on its quarterly steel requirements. Mills were asked to quote for all of the second half, but a good many declined to quote beyond the third quarter. Nearly all of the sheet bids were on the basis of the new classification and prices. Plates, shapes and bars were quite generally quoted at 1.65c., Eastern mills, including Pittsburgh and Youngstown, and at 1.70c. and 1.75c., Chicago district mills.

### CAST IRON PIPE

New inquiry for pressure pipe in the local terrtory is limited. Remsen, N. Y., is taking bids on 200 tons of small sizes, and Brooklyn is inquiring for 545 tons of 6, 8 and 12-in. pipe. Borough of Queens, New York, is in the market for 1340 tons of 20-in. Standard Oil Co. of N. J., is asking for bids on 8000 tons of centrifugal. pit cast and special joint pipe for an oil refinery to be constructed at Port Jerome, France. Ticonderoga, N. Y., placed 1189 tons of 10 to 14-in., and Inlet, N. Y., placed 800 tons of sizes up to 10 in., both awards going to R. D. Wood & Co. Hanover, N. H., placed contract for 800 tons of 12-in. and larger with Warren Foundry & Pipe Corpn., and West Newton. Mass., awarded 150 tons of 6, 8 and 12-in. to the same maker. Prices are irregular. Concessions of $1 to $2 a ton have been made on desirable tonnages.

Prices per net ton delivered New York: Water pipe, 6-in. and larger, $32.90; 4-in. and 5-in., $35.90; 3-in., $42.90. Class A and gas pipe, $3 extra.

### REINFORCING BARS

Quotations on billet steel bars are unchanged at 1.60c to 1.65c., Pittsburgh, or 1.93c. to 1.98c., New York, with concessions of $1 a ton and more on desirable tonnages. There is a fair total tonnage of new inquiry, but projects are generally small. The largest award this week was 2000 tons, placed by the P. T. Cox Contracting Co. for the New York Central Railroad's St. John's Park terminal in New York.

### OLD MATERIAL

Transactions are generally limited to small lots. Prices continue weak. Brokers have been offering $6.50 a ton, delivered Conshohocken, Pa., for a small tonnage of No. 2 heavy melting steel, and on shipments of No. 1 heavy melting steel to Buffalo, there are offers of $6.25 a ton, on barge, New York, a reduction of 25c. a ton. Foundry grade stove plate is off 25c. a ton, with brokers filling contracts with New Jersey consumers at $6.50 a ton, delivered. Heavy breakable cast is inactive, and most of the current shipments are to a Florence, N. J., foundry, for which $9, delivered, is being paid.

*Dealers' buying prices per gross ton, f.o.b. New York:*

| | | |
|---|---|---|
| No. 1 heavy melting steel | $4.50 to | $6.25 |
| Heavy melting steel (yard) | 3.00 to | 3.50 |
| No. 1 hvy. breakable cast | | 6.00 |
| Stove plate (steel works) | 3.75 to | 4.00 |
| Locomotive grate bars | 3.75 to | 4.00 |
| Machine shop turnings | | 2.00 |
| Short shoveling turnings | | 2.00 |
| Cast borings (blast fur. or steel works) | | 2.25 |
| Mixed borings and turnings | 1.75 to | 2.00 |
| Steel car axles | 12.00 to | 12.50 |
| Iron car axles | 16.50 to | 17.00 |
| Iron and steel pipe (1 in. dia., not under 2 ft. long) | 6.00 to | 6.25 |
| Forge fire | 4.50 to | 5.00 |
| No. 1 railroad wrought | | 8.25 |
| No. 1 yard wrought, long | | 7.25 |
| Rails for rolling | 6.00 to | 6.50 |
| Stove plate (foundry) | 4.25 to | 4.50 |
| Malleable cast (railroad) | 7.50 to | 8.00 |
| Cast borings (chemical) | 8.00 to | 8.50 |

*Prices per gross ton, deliv'd local foundries:*

| | | |
|---|---|---|
| No. 1 machry. cast | $11.50 to | $12.00 |
| No. 1 hvy. cast (columns, bldg. materials, etc.; cupola size) | 9.50 to | 10.00 |
| No. 2 cast (radiators, cast boilers, etc.) | 8.50 to | 9.00 |

▲ ▲ ▲

Orders for steel boilers in May totaled 646, of 572.681 sq. ft., compared with 689 of 825,203 sq. ft., according to reports received by the Bureau of the Census from 73 manufacturers.

### Warehouse Prices, f.o.b. New York

| | Base per Lb. |
|---|---|
| Plates and struc. shapes | 2.70c. to 3.10c. |
| Soft steel bars, small shapes | 2.70c. to 3.10c. |
| Iron bars | 3.24c. |
| Iron bars, Swed. charcoal | 7.00c. to 7.25c. |
| Cold-fin. shafting and screw stock— | |
| Rounds and hexagons | 3.40c. |
| Flats and squares | 3.90c. |
| Cold-roll. strip, soft and quarter hard | 4.95c. |
| Hoops | 3.75c. |
| Bands | 3.40c. |
| Blue ann'l'd sheets (No. 10) | 3.00c. to 3.25c. |
| Black sheets (No. 24*) | 3.50c. |
| Galvanized sheets (No. 24*) | 4.00c. |
| Long terne sheets (No. 24) | 5.00c. |
| Standard tool steel | 12.00c. |
| Wire, black annealed | 4.50c. |
| Wire, galv. annealed | 5.15c. |
| Tire steel, ½ x ½ in. and larger | 3.40c. |
| Smooth finish, 1 to 2½ x ¼ in. and larger | 3.75c. |
| Open-hearth spring steel, bases, | 4.50c. to 7.00c. |

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

| | Per Cent Off List |
|---|---|
| Machine bolts, cut thread: | |
| ¾ x 6 in. and smaller | 65 to 65 and 10 |
| 1 x 30 in. and smaller | 65 to 65 and 10 |
| Carriage bolts, cut thread: | |
| ½ x 6 in. and smaller | 65 to 65 and 10 |
| ¾ x 20 in. and smaller | 65 to 65 and 10 |

| | Per 100 Ft. |
|---|---|
| Boiler Tubes: | |
| Lap welded, 2-in | $19.00 |
| Seamless steel, 2-in | 20.25 |
| Charcoal iron, 2-in | 26.25 |
| Charcoal iron, 4-in | 67.00 |

# PHILADELPHIA

## Sheet and Plate Inquiry Better—Mill Operations Unchanged

PHILADELPHIA, June 30.—Steel inquiry, especially from users of sheets and plates, has been more active, but actual buying is still limited to small orders for prompt shipment.

Eastern Pennsylvania mills are not planning extended suspensions of operation in July, and will close only for the holiday week-end, with the exception of one plant, which will suspend for about nine days.

Contracts for third quarter delivery have been made by consumers of plates and bars, and in certain cases second quarter contracts not fully specified have been increased and extended into the next quarter. Prices are unchanged from those prevailing at the beginning of the second quarter.

While sheet mills will begin selling on the new classification and bases on July 1, an actual test of the new prices and differentials is not likely early in the month, as consumers have generally covered immediate needs on the old bases.

### STEEL BARS

Contracts for third quarter have been closed at 1.65c., Pittsburgh, or 1.94c., Philadelphia, and in certain instances second quarter contracts at 1.60c., Pittsburgh, or 1.89c., Philadelphia, have been extended into the third quarter. Billet steel reinforcing bars are quoted at 1.60c. to 1.65c., Pittsburgh, or 1.89c. to 1.94c., Philadelphia, with $1 or more granted in concessions on desirable projects. Rail steel bars range from 1.20c. to 1.30c., Pittsburgh, or 1.49c. to 1.59c., Philadelphia. Current reinforced concrete projects are generally small, but among the larger inquiries is 1700 tons for electrification on the Pennsylvania Railroad between Wilmington, Del., and Washington.

### PIG IRON

Buying continues limited to carload lots of foundry iron for prompt shipment, on which $16.50, furnace, usually applies. Occasional purchases of slightly larger lots of foundry iron bring concessions of 25c. a ton to $16.25 a ton, furnace. Southern sellers are maintaining $11, furnace, or $16.25, on dock, Philadelphia, but only a small tonnage of iron is moving to eastern Pennsylvania consumers. The Bureau of Supplies and Accounts, Washington, opens bids July 7 on 224 tons of low phosphorus for the Washington Navy Yard and 192 tons for Boston, Charleston, S. C., and Philadelphia. Bids are being taken under the recent ruling that American material will be given preference in the award unless the difference in price is excessive. Basic iron continues quiet, with no recent transactions reported. A steel company furnace and a merchant stack in eastern Pennsylvania are expected to go out of blast before the end of the summer.

*Prices per gross ton at Philadelphia:*

| | |
|---|---|
| East. Pa. No. 2, 1.75 to 2.25 sil. | $17.01 to $17.26 |
| East. Pa. No. 2X, 2.25 to 2.75 sil. | 17.51 to 17.76 |
| East. Pa. No. 1X | 18.01 to 18.26 |
| Basic (del'd east. Pa.) | 17.00 |
| Malleable | 19.00 to 20.00 |
| Stand. low phos. (f.o.b. east. Pa. furnace) | 23.00 to 24.00 |
| Cop. b'r'g low phos. (f.o.b. furnace) | 22.00 to 23.00 |
| Va. No. 2 plain, 1.75 to 2.25 sil. | 22.29 |
| Va. No. 2X, 2.25 to 2.75 sil. | 22.79 |

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

### SHAPES

Buying is small, with fabricating shops quoting on only a small amount of new business. Orders are generally for immediate shipment, the buyer sometimes asking for motor truck delivery instead of by rail if it will expedite the shipment. Prices are unchanged at 1.70c. a lb., f.o.b. nearest mill to consumer, or 1.76c., Philadelphia, with occasional concessions of $1 a ton on the larger contracts and 1.75c., mill, or 1.81c., Philadelphia, quoted on small, miscellaneous specifications.

### PLATES

A limited number of contracts have been made for third quarter delivery at 1.70c. to 1.75c. a lb., Coatesville, Pa., or 1.80½c. to 1.85½c., Philadelphia. In certain instances, second quarter contracts not fully specified have been extended. The past week has been more active and some substantial plate tonnages are in prospect for tank building projects and for barge construction.

### SHEETS

Consumers are receiving slightly more business than in previous weeks and this condition is reflected in a larger volume of small inquiries for sheets to be delivered promptly. Certain users have covered their requirements for two or three weeks in advance, taking advantage of the old classification and base prices. Such anticipation of requirements, however, has not been general. Selling on the former classification has continued to the end of June. On the new bases, quotations are: Hot-rolled, No. 10 gage, 1.70c., Pittsburgh, or 1.99c., Philadelphia; hot-rolled annealed, No. 24 gage, 2.40c., Pittsburgh, or 2.69c., Philadelphia; heavy cold-rolled, No. 10 gage, 2.35c., Pittsburgh, or 2.64c., Philadelphia; cold-rolled, No. 20 gage, 2.95c., Pittsburgh, or 3.24c., Philadelphia; and galvanized, No. 24 gage, 2.90c., Pittsburgh, or 3.19c., Philadelphia.

**Warehouse Prices, f.o.b. Philadelphia**

| | Base per Lb. |
|---|---|
| Plates, ¼-in. and heavier | 2.50c. |
| Structural shapes | 2.50c. |
| Soft steel bars, small shapes, iron bars (except bands) | 2.60c. |
| Reinforc. steel bars, sq., twisted and deform | 2.50c. to 2.60c. |
| Cold-fin. steel, rounds and hex | 3.40c. |
| Cold-fin. steel, sq. and flats | 3.90c. |
| Steel hoops | 3.15c. |
| Steel bands, No. 12 to ¼-in. inclu. | 2.90c. |
| Spring steel | 5.00c. |
| Hot rolled, box annealed sheets (No. 24) | 3.40c. |
| Galvanized sheets (No. 24) | 3.85c. |
| Hot rolled blue annealed sheets (No. 10) | 3.05c. |
| Diam. pat. floor plates, ¼-in. | 5.20c. |
| Swedish iron bars | 6.60c. |

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

### IMPORTS

In the week ended June 27, 3129 tons of chrome ore arrived at this port from Russia, 6660 tons of iron ore from Algeria, 50 tons of ferromanganese from Jugoslavia, while pig iron imports consisted of 2370 tons from British India and 200 tons from Sweden. Steel arrivals were 135 tons of structural shapes from Belgium and 10 tons of bearing bars and six tons of bearing tubes from Sweden.

### OLD MATERIAL

An eastern Pennsylvania consumer of No. 2 heavy melting steel has contracted for a small tonnage at $7 a ton, delivered. Otherwise, the market is quiet, with transactions generally limited to occasional distress sales of carload lots of material.

*Prices per gross ton delivered consumers' yards, Philadelphia district:*

| | |
|---|---|
| No. 1 heavy melting steel | $8.00 to $9.00 |
| No. 2 heavy melting steel | 7.00 |
| Heavy melting steel (yard) | 6.50 |
| No. 1 railroad wrought | 10.00 to 10.50 |
| Bundled sheets (for steel works) | 6.50 |
| Hydraulic compressed, new | 7.00 to 8.00 |
| Hydraulic compressed, old | 6.00 to 6.50 |
| Machine shop turnings (for steel works) | 5.00 to 6.00 |
| Heavy axle turnings (or equiv.) | 8.00 to 8.50 |
| Cast borings (for steel works and roll. mill) | 5.00 to 6.00 |
| Heavy breakable cast (for steel works) | 9.50 to 10.00 |
| Railroad grate bars | 8.00 |
| Stove plate (for steel works) | 8.00 |
| No. 1 low phos., hvy. (0.04% and under) | 12.00 to 13.00 |
| Couplers and knuckles | 11.00 to 11.50 |
| Rolled steel wheels | 10.00 to 11.00 |
| No. 1 blast f'nace (nom.) | 4.50 |
| Wrot. iron and soft steel pipe and tubes (new specific.) | 11.00 to 11.50 |
| Shafting | 16.50 to 17.00 |
| Steel axles | 16.00 to 16.50 |
| No. 1 forge fire | 8.00 to 8.50 |
| Cast iron carwheels | 12.00 to 12.50 |
| No. 1 cast | 11.00 to 11.50 |
| Cast borings (for chem. plant) | 12.00 to 12.50 |
| Steel rails for rolling | 10.50 to 11.00 |

# BOSTON

## Pig Iron Sales Increase—Scrap Market Stagnant—Other Lines Dull

BOSTON, June 30.—Pig iron sales 1200 tons were more than double those of the previous week. The bulk of the iron sold was Buffalo and Indian, and included 250 tons of No. 2X Buffalo to a Bath, Me., foundry at $14.75 a ton, furnace. In contrast, low-silicon Buffalo iron was sold at $15.50 a ton, furnace, and No. 2X at $16. Indian iron was sold at $18.25, $18.50 and $19.50 a ton, on dock here, duty paid, depending on the freight rate. There is no increase in the New England melt. Additional reductions in foundry labor wages are noted.

*Foundry iron prices per gross ton deliv'd to most New England points:*

| | |
|---|---|
| •Buffalo, sil. 1.75 to 2.25 | $19.91 to $20.91 |
| •Buffalo, sil. 2.25 to 2.75 | 19.91 to 20.91 |
| †Buffalo, sil. 1.75 to 2.25 | 19.28 to 20.28 |
| †Buffalo, sil. 2.25 to 2.75 | 19.28 to 20.28 |
| •Ala., sil. 1.75 to 2.25 | 20.11 to 20.61 |
| •Ala., sil. 2.25 to 2.75 | 20.61 to 21.11 |
| †Ala., sil. 1.75 to 2.25 | 16.75 |
| †Ala., sil. 2.25 to 2.75 | 17.25 |

Freight rates: $4.91 all rail from Buffalo; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
•All rail rate.
†Rail and water rate.

### CAST IRON PIPE

The market is quiet. Newton, Mass., has placed 200 tons with the Warren Foundry & Pipe Co., the largest letting the past week. One 700-ton lot and another sizable tonnage probably will be placed this week. Prices are weak, $32 a ton, on cars foundry, now being the average asking price for 6-in. and larger pipe, and even that price was shaded recently.

### FABRICATED STEEL

Little fabricated work was let the past week, but quite a number of jobs are being figured and indications are the market will be moderately active throughout the summer. In connection with the recent letting of 600 tons of steel for the Boston city hospital unit to the Palmer Steel Co., announcement is made that all of the steel will be shop welded at the company's Springfield, Mass., plant, and all connections field welded.

### REINFORCING STEEL

The largest letting was 200 tons for a State road. The outlook for business is a little brighter. On the average run of business, billet steel bars from stock are 3c. a lb., base for 1 to 5-ton lots, 2.40c. for 6 to 99-ton lots, and 2.30c. for 100-ton and larger lots, while rail steel bars are 2.26½c. a lb., on cars Boston, but these prices have been shaded on round tonnages.

### OLD MATERIAL

Most of the little No. 1 heavy melting steel bought the past week brought $4.10, on cars shipping point, and skeleton, $3.10. Offers of $6.60 a ton, on cars shipping point, for low phosphorus have found few sellers. A little breakable cast and mixed borings and turnings changed hands. Otherwise, brokers have done virtually nothing. Yards continue to accumulate textile machinery cast through forced plant sales, but there is little consumption of that material at the moment.

*Buying prices per gross ton, f.o.b. Boston rate shipping points:*

| | |
|---|---|
| No. 1 heavy melting steel | $4.00 to $4.25 |
| Scrap T rails | 4.00 to 4.25 |
| Scrap girder rails | 3.00 to 3.25 |
| No. 1 railroad wrought | 7.00 to 7.50 |
| Machine shop turnings | 0.60 to 0.80 |
| Cast iron borings (steel works and rolling mill) | 0.60 to 1.00 |
| Bundled skeleton, long | 3.00 to 3.25 |
| Forge flashings | 5.00 to 5.25 |
| Blast furnace borings and turnings | 1.00 |
| Forge scrap | 0.50 to 0.80 |
| Shafting | 10.00 to 10.50 |
| Steel car axles | 11.00 to 12.00 |
| Wrought pipe, 1 in. in diameter (over 2 ft. long) | 5.00 to 5.25 |
| Rails for rolling | 7.50 to 8.00 |
| Cast iron borings, chemical | 7.00 to 7.25 |
| No. 2 cast | 5.00 to 5.25 |
| *Prices per gross ton deliv'd consumers' yards:* | |
| Textile cast | $9.50 to $10.00 |
| No. 1 machinery cast | 9.50 to 10.00 |
| Stove plate | 5.00 to 5.25 |
| Railroad malleable | 13.00 to 13.50 |

**Warehouse Prices, f.o.b. Boston**

| | Base per Lb. |
|---|---|
| Plates | 3.36½c. |
| Structural shapes— | |
| Angles and beams | 3.36½c. |
| Tees | 3.36½c. |
| Zees | 3.36½c. |
| Soft steel bars, small shapes | 3.26½c. |
| Reinforcing bars | 3.11½c. to 3.26½c. |
| Iron bars— | |
| Refined | 3.26½c. |
| Best refined | 4.60c. |
| Norway rounds | 6.60c. |
| Norway squares and flats | 7.10c. |
| Spring steel— | |
| Open-hearth | 5.00c. to 10.00c. |
| Crucible | 12.00c. |
| Tire steel | 4.50c. to 5.75c. |
| Bands | 4.015c. to 5.00c. |
| Hoop steel | 5.50c. to 6.00c. |
| Cold-rolled steel— | |
| Rounds and hex | 3.50c. to 5.50c. |
| Squares and flats | 4.00c. to 6.00c. |
| Toe calk steel | 6.00c. |
| Rivets, structural or boiler | 4.80c. |
| | Per Cent Off List |
| Machine bolts | 60 and 5 |
| Carriage bolts | 60 and 5 |
| Lag screws | 60 and 5 |
| Hot-pressed nuts | 60 and 5 |
| Cold-punched nuts | 60 and 5 |
| Stove bolts | 70 and 10 |

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# BIRMINGHAM

## Higher Sheet Quotations Now in Effect—Bars, Plates, Shapes Weak

BIRMINGHAM, June 29.—There are still no signs that the arrival of the third quarter will bring any marked change in the pig iron situation. Only a few inquiries about advance tonnage have been received, and sales have been confined to small amounts. Prospects indicate that spot buying will continue in the near future. Shipments are slow, with the result that yard stocks are steadily increasing, suggesting the possibility of further curtailment of production Quotations for district shipments remain at $12 to $13. Twelve furnaces are in blast, the same as last week.

*Prices per gross ton, f.o.b. Birmingham dist. furnaces:*

| | |
|---|---|
| No. 2 fdy., 1.75 to 2.25 sil. | $12.00 to $13.00 |
| No. 1 fdy., 2.25 to 2.75 sil. | 12.50 to 13.50 |
| Basic | 12.00 to 13.00 |

### CAST IRON PIPE

Inquiries increased during the past week and some fair sized tonnage is to be available within the next two weeks, particularly on the Pacific Coast. American Cast Iron Pipe Co. has secured 600 tons from Hartford, Conn., and 750 tons from Vallejo, Cal. Other orders run mostly to small amounts. There has been no change in plant operations, which are around 60 per cent. Quotations remain at $35 to $36, base.

### FINISHED STEEL

New sheet quotations for the third quarter carry price advances ranging from $1 to $6. The new price for No. 24 galvanized is 3.05c., an increase of $4 a ton. Other adjustments have been made to conform to the new classification. Soft steel bars, tank plates, and structural shapes are weaker, however, and these have been marked down to 1.70c. One steel manufacturer continues to report an improvement in inquiries and orders, while another continues at about the same level as for the past several weeks. Structural steel fabricators have within the past two weeks secured several contracts above the ordinary run of the month. Virginia Bridge & Iron Co. was awarded 3100 tons for a Louisville & Nashville Railroad bridge at Danville, Tenn.; also 150 tons for a court house at Anniston, Ala. Ingalls Iron works has secured 460 tons for a paper mill addition at Hodge, La. Birmingham Tank Co. will furnish 300 tons of plate work and tanks for the same project. Reinforcing bar fabricators continue to secure only small-lot business. Open-hearth operations are the same as for three weeks past, with the Tennessee company alternating with 10 and 11 and the Gulf States Steel operating two.

### OLD MATERIAL

There is almost a complete absence of buying. Shipments on contract are very much restricted.

*Prices per gross ton deliv'd Birmingham dist. consumers' yards:*

| | |
|---|---|
| Heavy melting steel | $9.50 to $10.00 |
| Scrap steel rails | 10.00 |
| Short shoveling turnings | 7.50 |
| Cast iron borings | (No market) |
| Stove plate | 7.00 |
| Steel axles | 15.00 to 16.00 |
| Iron axles | 18.00 |
| No. 1 railroad wrought | 8.00 |
| Rails for rolling | 11.50 to 12.00 |
| No. 1 cast | 9.50 |
| Tramcar wheels | 10.00 to 10.25 |
| Cast iron borings, chem | 13.50 |

# ST. LOUIS

## Gain in Pig Iron Buying for Early Shipment Indicates Low Stocks

ST. LOUIS, June 30.—An improvement in buying of pig iron, largely orders for carloads for immediate delivery, is reported, which is taken as an indication that stocks of raw material in hands of melters are exceedingly low. The melt of pig iron in the St. Louis industrial district is said to be smaller than it was a few weeks ago. This decrease is seasonal, with the extreme heat a factor in holding down operations. Prices are unchanged.

*Prices per gross ton at St. Louis:*

| | |
|---|---|
| No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill. | $17.50 |
| Malleable, f.o.b. Granite City | 17.50 |
| N'th'n No. 2 fdy., deliv'd St. Louis | 19.66 |
| Southern No. 2 fdy., deliv'd | 15.42 |
| Northern malleable, deliv'd | 19.66 |
| Northern basic, deliv'd | 19.66 |

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

### FINISHED STEEL

Effective July 1, the Granite City Steel Co. has made the following prices f.o.b. Gary: hot-rolled and annealed sheets, No. 16 gage and heavier, No. 10 gage base, 1.95c. a lb.; No. 17 gage and lighter, No. 24 gage base, 2.50c.; heavy cold-rolled sheets, No. 16 gage and heavier, No. 10 gage base, 2.45c.; cold-rolled sheets, No. 17 gage and lighter, No. 20 gage base, 3.05c.; galvanized sheets, No. 24 gage base, 3c., with St. Louis delivered prices 25½c. higher.

Incoming business of the Granite City Steel Co. during June has been very satisfactory, exceeding by a very nice margin the tonnage received up to the corresponding period last month. The demand for tin plate continues to be satisfactory. The only sizable structural project pending is 1100 tons of columns for the Illinois Terminal warehouse.

### OLD MATERIAL

The only sizable transaction was the purchase of 5000 tons of heavy melting steel by an East Side mill for shipment within 60 days at the present market. Other consumers have not indicated that they will be in the market soon. Railroad lists have been heavy, but very little scrap has been coming in from the country dealers. Miscellaneous standard-section rails are 25c. higher. Rails for rolling and steel car axles have been marked up 50c. a ton.

Railroad lists: Pennsylvania, 35,015 tons; Missouri-Kansas-Texas, 1150 tons; Louisville & Nashville, 110 tons; Milwaukee Road, 144 carloads; Missouri Pacific, 114 carloads and 54 carloads; New York, Chicago & St. Louis, 33 carloads; St. Louis-San Francisco, 18 carloads; Mobile & Ohio, 11 carloads.

*Dealers' buying prices per gross ton, f.o.b. St. Louis district:*

| | |
|---|---|
| Selected heavy melting steel | $8.25 to $8.75 |
| No. 1 heavy melting or shoveling steel | 8.00 to 8.50 |
| No. 2 heavy melting or shoveling steel | 7.25 to 7.75 |
| No. 1 locomotive tires | 10.00 to 10.50 |
| Misc. stand.-sec. rails including frogs, switches and guards, cut apart | 9.25 to 9.75 |
| Railroad springs | 10.00 to 10.50 |
| Bundled sheets | 6.00 to 6.50 |
| No. 2 railroad wrought | 8.00 to 8.50 |
| No. 1 busheling | 6.00 to 6.50 |
| Cast iron borings and shoveling turnings | 5.00 to 5.50 |
| Iron rails | 8.00 to 8.50 |
| Rails for rolling | 10.50 to 11.00 |
| Machine shop turnings | 2.75 to 3.25 |
| Heavy turnings | 6.00 to 6.50 |
| Steel car axles | 13.50 to 14.00 |
| Iron car axles | 17.50 to 18.00 |
| Wrot. iron bars and trans. | 8.75 to 9.25 |
| No. 1 railroad wrought | 5.50 to 6.00 |
| Steel rails, less than 3 ft | 11.00 to 11.50 |
| Steel angle bars | 8.50 to 9.00 |
| Cast iron carwheels | 7.00 to 7.50 |
| No. 1 machinery cast | 8.00 to 8.50 |
| Railroad malleable | 8.00 to 8.50 |
| No. 1 railroad cast | 8.00 to 8.50 |
| Stove plate | 7.00 to 7.50 |
| Relay. rails, 60 lb. and under | 16.00 to 16.50 |
| Relay. rails, 70 lb. and over | 20.00 to 21.00 |
| Agricult. malleable | 7.50 to 8.00 |

**Warehouse Prices, f.o.b. St. Louis**

| | Base per Lb. |
|---|---|
| Plates and struc. shapes | 3.15c. |
| Bars, soft steel or iron | 3.00c. |
| Cold-fin. rounds, shafting, screw stock | 3.35c. |
| Black sheets (No. 24) | 3.80c. |
| Galv. sheets (No. 24) | 4.35c. |
| Blue ann'l'd sheets (No. 10) | 3.45c. |
| Black corrug. sheets (No. 24) | 3.85c. |
| Galv. corrug. sheets | 4.40c. |
| Structural rivets | 4.15c. |
| Boiler rivets | 4.15c. |
| | **Per Cent Off List** |
| Tank rivets, ⅞-in. and smaller, 100 lb. or more | 65 |
| Less than 100 lb | 60 |
| Machine bolts | 60 and 10 |
| Carriage bolts | 60 and 10 |
| Lag screws | 60 and 10 |
| Hot-pressed nuts, sq., blank or tapped, 200 lb. or more | 60 and 10 |
| Less than 200 lb | 50 and 10 |
| Hot-pressed nuts, hex., blank or tapped, 200 lb. or more | 60 and 10 |
| Less than 200 lb | 50 and 10 |

▲ ▲ ▲

# CINCINNATI

## Better Feeling in Trade Not Reflected in Business Volume

CINCINNATI, June 29.—While pig iron business has not changed in the last week, there appears to be a better feeling throughout the trade and expectations that fall activity will begin early. Bookings of district furnace representatives last week were about 1800 tons. Southern furnaces are not getting much of the current business, but quotations on Southern iron are being firmly held. District foundries, feeling the usual seasonal recession of business, are operating at a low rate. A central Ohio consumer bought 300 tons of Northern foundry iron; the remainder of the week's business was in small lots. An Indiana melter is in the market for 500 to 1000 tons of either Southern or Northern foundry iron.

*Prices per gross ton, deliv'd Cincinnati:*

| | |
|---|---|
| Ala. fdy., sil. 1.75 to 2.25 | $14.69 |
| Ala., fdy., sil. 2.25 to 2.75 | 15.19 |
| Tenn. fdy., sil. 1.75 to 2.25 | 14.69 |
| S'th'n Ohio silvery, 8 per cent | 23.89 |

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

### FINISHED STEEL

District mills, while reporting the usual seasonal decline anticipate a return of better demand during August, presaging an early fall upturn. Consumers continue to buy sparingly.

### OLD MATERIAL

Movement of scrap on contract is noticeably retarded, since only one or two district mills are accepting shipments. New business is negligible. Prices are unchanged, although the slowness of demand is causing an undertone of softness.

*Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:*

| | |
|---|---|
| Heavy melting steel | $7.25 to $7.75 |
| Scrap rails for melting | 10.25 to 10.75 |
| Loose sheet clipping | 3.50 to 4.00 |
| Bundled sheets | 6.75 to 7.25 |
| Cast iron borings | 3.75 to 4.25 |
| Machine shop turnings | 4.00 to 4.50 |
| No. 1 busheling | 5.75 to 6.25 |
| No. 2 busheling | 3.75 to 4.25 |
| Rails for rolling | 11.00 to 11.50 |
| No. 1 locomotive tires | 9.50 to 10.00 |
| No. 2 railroad wrought | 7.25 to 7.75 |
| Short rails | 13.00 to 13.50 |
| Cast iron carwheels | 10.50 to 11.00 |
| No. 1 machinery cast | 12.50 to 13.00 |
| No. 1 railroad cast | 11.50 to 12.00 |
| Burnt cast | 5.25 to 5.75 |
| Stove plate | 5.25 to 5.75 |
| Brake shoes | 5.25 to 5.75 |
| Agricultural malleable | 10.00 to 10.50 |
| Railroad malleable | 11.00 to 11.50 |

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The Marion Steam Shovel Co., Marion, Ohio, has shipped to the McWilliams Dredging Co., Chicago, an aluminum alloy boom for use on one of its giant dragline excavators—the first ever built for a large dragline. Aluminum alloy, which weighs about one-third as much as steel, permits this boom to be built with a weight less than one-half that of a steel boom of equivalent length and strength.

**Warehouse Prices, f.o.b. Cincinnati**

| | Base per Lb. |
|---|---|
| Plates and struc. shapes | 3.25c. |
| Bars, soft steel or iron | 3.00c. |
| New billet reinforc. bars | 3.00c. |
| Rail steel reinforc. bars | 3.00c. |
| Hoops | 3.90c. |
| Bands | 3.20c. |
| Cold-fin. rounds and hex. | 3.50c. |
| Squares | 4.00c. |
| Black sheets (No. 24) | 3.75c. |
| Galv. sheets (No. 24) | 4.25c. |
| Blue ann'l'd sheets (No. 10) | 3.30c. |
| Structural rivets | 4.20c. |
| Small rivets | 60 per cent off list |
| No. 9 ann'l'd wire, per 100 lb | $3.00 |
| Com. wire nails, base per keg (25 kegs or more) | 2.95 |
| Cement c't'd nails, base 100 lb. keg | 2.95 |
| Chain, per 100 lb | 10.25 |
| | **Net per 100 Ft.** |
| Lap-welded steel boiler tubes, 2-in. | $16.50 |
| 4-in. | 34.50 |
| Seamless steel boiler tubes, 2-in. | 17.50 |
| 4-in. | 36.00 |

# BOSTON

## Pig Iron Sales Increase—Scrap Market Stagnant—Other Lines Dull

BOSTON, June 30.—Pig iron sales 1260 tons were more than double those of the previous week. The bulk of the iron sold was Buffalo and Indian, and included 250 tons of No. 2X Buffalo to a Bath, Me., foundry at $14.75 a ton, furnace. In contrast, low-silicon Buffalo iron was sold at $15.50 a ton, furnace, and No. 2X at $16. Indian iron was sold at $18.25, $18.50 and $19.50 a ton, on dock here, duty paid, depending on the freight rate. There is no increase in the New England melt. Additional reductions in foundry labor wages are noted.

*Foundry iron prices per gross ton deliv'd to most New England points:*

| | | |
|---|---|---|
| •Buffalo, sil. 1.75 to 2.25 | $19.91 to | $20.91 |
| •Buffalo, sil. 2.25 to 2.75 | 19.91 to | 20.91 |
| †Buffalo, sil. 1.75 to 2.25 | 19.28 to | 20.28 |
| †Buffalo, sil. 2.25 to 2.75 | 19.28 to | 20.28 |
| •Ala., sil. 1.75 to 2.25 | 20.11 to | 20.61 |
| •Ala., sil. 2.25 to 2.75 | 20.61 to | 21.11 |
| †Ala., sil. 1.75 to 2.25 | | 16.75 |
| †Ala., sil. 2.25 to 2.75 | | 17.25 |

Freight rates: $4.91 all rail from Buffalo; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
•All rail rate.
†Rail and water rate.

### CAST IRON PIPE

The market is quiet. Newton, Mass., has placed 200 tons with the Warren Foundry & Pipe Co., the largest letting the past week. One 700-ton lot and another sizable tonnage probably will be placed this week. Prices are weak, $32 a ton, on cars foundry, now being the average asking price for 6-in. and larger pipe, and even that price was shaded recently.

### FABRICATED STEEL

Little fabricated work was let the past week, but quite a number of jobs are being figured and indications are the market will be moderately active throughout the summer. In connection with the recent letting of 600 tons of steel for the Boston city hospital unit to the Palmer Steel Co., announcement is made that all of the steel will be shop welded at the company's Springfield, Mass., plant, and all connections field welded.

### REINFORCING STEEL

The largest letting was 200 tons for a State road. The outlook for business is a little brighter. On the average run of business, billet steel bars from stock are 3c. a lb., base for 1 to 5-ton lots, 2.40c. for 6 to 99-ton lots, and 2.30c. for 100-ton and larger lots, while rail steel bars are 2.26½c. a lb., on cars Boston, but these prices have been shaded on round tonnages.

### OLD MATERIAL

Most of the little No. 1 heavy melting steel bought the past week brought $4.10, on cars shipping point, and skeleton, $3.10. Offers of $6.60 a ton, on cars shipping point, for low phosphorus have found few sellers. A little breakable cast and mixed borings and turnings changed hands. Otherwise, brokers have done virtually nothing. Yards continue to accumulate textile machinery cast through forced plant sales, but there is little consumption of that material at the moment.

*Buying prices per gross ton, f.o.b. Boston rate shipping points:*

| | | |
|---|---|---|
| No. 1 heavy melting steel | $4.00 to | $4.25 |
| Scrap T rails | 4.00 to | 4.25 |
| Scrap girder rails | 3.00 to | 3.25 |
| No. 1 railroad wrought | 7.00 to | 7.50 |
| Machine shop turnings | 0.60 to | 0.80 |
| Cast iron borings (steel works and rolling mill) | 0.60 to | 1.00 |
| Bundled skeleton, long | 3.00 to | 3.25 |
| Forge flashings | 5.00 to | 5.25 |
| Blast furnace borings and turnings | | 1.00 |
| Forge scrap | 0.50 to | 0.80 |
| Shafting | 10.00 to | 10.50 |
| Steel car axles | 11.00 to | 12.00 |
| Wrought pipe, 1 in. in diameter (over 2 ft. long) | 5.00 to | 5.25 |
| Rails for rolling | 7.50 to | 8.00 |
| Cast iron borings, chemical | 7.00 to | 7.25 |
| No. 2 cast | 5.00 to | 5.25 |
| *Prices per gross ton deliv'd consumers' yards:* | | |
| Textile cast | $9.50 to | $10.00 |
| No. 1 machinery cast | 9.50 to | 10.00 |
| Stove plate | 5.00 to | 5.25 |
| Railroad malleable | 13.00 to | 13.50 |

**Warehouse Prices, f.o.b. Boston**

| | Base per Lb. |
|---|---|
| Plates | 3.36½c. |
| Structural shapes— | |
| Angles and beams | 3.36½c. |
| Tees | 3.36½c. |
| Zees | 3.36½c. |
| Soft steel bars, small shapes | 3.26½c. |
| Reinforcing bars | 3.11½c. to 3.26½c. |
| Iron bars— | |
| Refined | 3.26½c. |
| Best refined | 4.60c. |
| Norway rounds | 6.60c. |
| Norway squares and flats | 7.10c. |
| Spring steel— | |
| Open-hearth | 5.00c. to 10.00c. |
| Crucible | 12.00c. |
| Tire steel | 4.50c. to 5.75c. |
| Bands | 4.015c. to 5.00c. |
| Hoop steel | 5.50c. to 6.00c. |
| Cold-rolled steel— | |
| Rounds and hex | 3.50c. to 5.50c. |
| Squares and flats | 4.00c. to 6.00c. |
| Toe calk steel | 6.00c. |
| Rivets, structural or boiler | 4.80c. |
| | Per Cent Off List |
| Machine bolts | 60 and 5 |
| Carriage bolts | 60 and 5 |
| Lag screws | 60 and 5 |
| Hot-pressed nuts | 60 and 5 |
| Cold-punched nuts | 60 and 5 |
| Stove bolts | 70 and 10 |

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# BIRMINGHAM

## Higher Sheet Quotations Now in Effect—Bars, Plates, Shapes Weak

BIRMINGHAM, June 29.—There are still no signs that the arrival of the third quarter will bring any marked change in the pig iron situation. Only a few inquiries about advance tonnage have been received, and sales have been confined to small amounts. Prospects indicate that spot buying will continue in the near future. Shipments are slow, with the result that yard stocks are steadily increasing, suggesting the possibility of further curtailment of production Quotations for district shipments remain at $12 to $13. Twelve furnaces are in blast, the same as last week.

*Prices per gross ton, f.o.b. Birmingham dist. furnaces:*

| | | |
|---|---|---|
| No. 2 fdy., 1.75 to 2.25 sil. | $12.00 to | $13.00 |
| No. 1 fdy., 2.25 to 2.75 sil. | 12.50 to | 13.50 |
| Basic | 12.00 to | 13.00 |

### CAST IRON PIPE

Inquiries increased during the past week and some fair sized tonnage is to be available within the next two weeks, particularly on the Pacific Coast. American Cast Iron Pipe Co. has secured 600 tons from Hartford, Conn., and 750 tons from Vallejo, Cal. Other orders run mostly to small amounts. There has been no change in plant operations, which are around 60 per cent. Quotations remain at $35 to $36, base.

### FINISHED STEEL

New sheet quotations for the third quarter carry price advances ranging from $1 to $6. The new price for No. 24 galvanized is 3.05c., an increase of $4 a ton. Other adjustments have been made to conform to the new classification. Soft steel bars, tank plates, and structural shapes are weaker, however, and these have been marked down to 1.70c. One steel manufacturer continues to report an improvement in inquiries and orders, while another continues at about the same level as for the past several weeks. Structural steel fabricators have within the past two weeks secured several contracts above the ordinary run of the month. Virginia Bridge & Iron Co. was awarded 3100 tons for a Louisville & Nashville Railroad bridge at Danville, Tenn.; also 150 tons for a court house at Anniston, Ala. Ingalls Iron works has secured 460 tons for a paper mill addition at Hodge, La. Birmingham Tank Co. will furnish 300 tons of plate work and tanks for the same project. Reinforcing bar fabricators continue to secure only small-lot business. Open-hearth operations are the same as for three weeks past, with the Tennessee company alternating with 10 and 11 and the Gulf States Steel operating two.

### OLD MATERIAL

There is almost a complete absence of buying. Shipments on contract are very much restricted.

*Prices per gross ton deliv'd Birmingham dist. consumers' yards:*

| | | |
|---|---|---|
| Heavy melting steel | $9.50 to | $10.00 |
| Scrap steel rails | | 10.00 |
| Short shoveling turnings | | 7.50 |
| Cast iron borings | (No market) | |
| Stove plate | | 7.00 |
| Steel axles | 15.00 to | 16.00 |
| Iron axles | | 18.00 |
| No. 1 railroad wrought | | 8.00 |
| Rails for rolling | 11.50 to | 12.00 |
| No. 1 cast | | 9.50 |
| Tramcar wheels | 10.00 to | 10.25 |
| Cast iron borings, chem. | | 13.50 |

# ST. LOUIS

## Gain in Pig Iron Buying for Early Shipment Indicates Low Stocks

ST. LOUIS, June 30.—An improvement in buying of pig iron, largely orders for carloads for immediate delivery, is reported, which is taken as an indication that stocks of raw material in hands of melters are exceedingly low. The melt of pig iron in the St. Louis industrial district is said to be smaller than it was a few weeks ago. This decrease is seasonal, with the extreme heat a factor in holding down operations. Prices are unchanged.

*Prices per gross ton at St. Louis:*

| | |
|---|---|
| No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill. | $17.50 |
| Malleable, f.o.b. Granite City | 17.50 |
| N'th'n No. 2 fdy., deliv'd St. Louis | 19.66 |
| Southern No. 2 fdy., deliv'd | 15.42 |
| Northern malleable, deliv'd | 19.66 |
| Northern basic, deliv'd | 19.66 |

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

### FINISHED STEEL

Effective July 1, the Granite City Steel Co. has made the following prices f.o.b. Gary: hot-rolled and annealed sheets, No. 16 gage and heavier, No. 10 gage base, 1.95c. a lb.; No. 17 gage and lighter, No. 24 gage base, 2.50c.; heavy cold-rolled sheets, No. 16 gage and heavier, No. 10 gage base, 2.45c.; cold-rolled sheets, No. 17 gage and lighter, No. 20 gage base, 3.05c.; galvanized sheets, No. 24 gage base, 3c., with St. Louis delivered prices 25½c. higher.

Incoming business of the Granite City Steel Co. during June has been very satisfactory, exceeding by a very nice margin the tonnage received up to the corresponding period last month. The demand for tin plate continues to be satisfactory. The only sizable structural project pending is 1100 tons of columns for the Illinois Terminal warehouse.

### OLD MATERIAL

The only sizable transaction was the purchase of 5000 tons of heavy melting steel by an East Side mill for shipment within 60 days at the present market. Other consumers have not indicated that they will be in the market soon. Railroad lists have been heavy, but very little scrap has been coming in from the country dealers. Miscellaneous standard-section rails are 25c. higher. Rails for rolling and steel car axles have been marked up 50c. a ton.

Railroad lists: Pennsylvania, 35,015 tons; Missouri-Kansas-Texas, 1150 tons; Louisville & Nashville, 110 tons; Milwaukee Road, 144 carloads; Missouri Pacific, 114 carloads and 54 carloads; New York, Chicago & St. Louis, 33 carloads; St. Louis-San Francisco, 18 carloads; Mobile & Ohio, 11 carloads.

*Dealers' buying prices per gross ton, f.o.b. St. Louis district:*

| | |
|---|---|
| Selected heavy melting steel | $8.25 to $8.75 |
| No. 1 heavy melting or shoveling steel | 8.00 to 8.50 |
| No. 2 heavy melting or shoveling steel | 7.25 to 7.75 |
| No. 1 locomotive tires | 10.00 to 10.50 |
| Misc. stand.-sec. rails including frogs, switches and guards, cut apart | 9.25 to 9.75 |
| Railroad springs | 10.00 to 10.50 |
| Bundled sheets | 6.00 to 6.50 |
| No. 2 railroad wrought | 8.00 to 8.50 |
| No. 1 busheling | 6.00 to 6.50 |
| Cast iron borings and shoveling turnings | 5.00 to 5.50 |
| Iron rails | 8.00 to 8.50 |
| Rails for rolling | 10.50 to 11.00 |
| Machine shop turnings | 2.75 to 3.25 |
| Heavy turnings | 6.00 to 6.50 |
| Steel car axles | 13.50 to 14.00 |
| Iron car axles | 17.50 to 18.00 |
| Wrot. iron bars and trans. | 8.75 to 9.25 |
| No. 1 railroad wrought | 5.50 to 6.00 |
| Steel rails, less than 3 ft | 11.00 to 11.50 |
| Steel angle bars | 8.50 to 9.00 |
| Cast iron carwheels | 7.00 to 7.50 |
| No. 1 machinery cast | 8.00 to 8.50 |
| Railroad malleable | 8.00 to 8.50 |
| No. 1 railroad cast | 8.00 to 8.50 |
| Stove plate | 7.00 to 7.50 |
| Relay. rails, 60 lb. and under | 16.00 to 16.50 |
| Relay. rails, 70 lb. and over | 20.00 to 21.00 |
| Agricult. malleable | 7.50 to 8.00 |

**Warehouse Prices, f.o.b. St. Louis**

| | Base per Lb. |
|---|---|
| Plates and struc. shapes | 3.15c. |
| Bars, soft steel or iron | 3.00c. |
| Cold-fin. rounds, shafting, screw stock | 3.35c. |
| Black sheets (No. 24) | 3.80c. |
| Galv. sheets (No. 24) | 4.35c. |
| Blue ann'l'd sheets (No. 10) | 3.45c. |
| Black corrug. sheets (No. 24) | 3.85c. |
| Galv. corrug. sheets | 4.40c. |
| Structural rivets | 4.15c. |
| Boiler rivets | 4.15c. |
| | Per Cent Off List |
| Tank rivets, ⅞-in. and smaller, 100 lb. or more | 65 |
| Less than 100 lb. | 60 |
| Machine bolts | 60 and 10 |
| Carriage bolts | 60 and 10 |
| Lag screws | 60 and 10 |
| Hot-pressed nuts, sq., blank or tapped, 200 lb. or more | 60 and 10 |
| Less than 200 lb. | 50 and 10 |
| Hot-pressed nuts, hex., blank or tapped, 200 lb. or more | 60 and 10 |
| Less than 200 lb. | 50 and 10 |

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# CINCINNATI

## Better Feeling in Trade Not Reflected in Business Volume

CINCINNATI, June 29.—While pig iron business has not changed in the last week, there appears to be a better feeling throughout the trade and expectations that fall activity will begin early. Bookings of district furnace representatives last week were about 1800 tons. Southern furnaces are not getting much of the current business, but quotations on Southern iron are being firmly held. District foundries, feeling the usual seasonal recession of business, are operating at a low rate. A central Ohio consumer bought 300 tons of Northern foundry iron; the remainder of the week's business was in small lots. An Indiana melter is in the market for 500 to 1000 tons of either Southern or Northern foundry iron.

*Prices per gross ton, deliv'd Cincinnati:*

| | |
|---|---|
| Ala. fdy., sil. 1.75 to 2.25 | $14.69 |
| Ala., fdy., sil. 2.25 to 2.75 | 15.19 |
| Tenn. fdy., sil. 1.75 to 2.25 | 14.69 |
| S'th'n Ohio silvery, 8 per cent | 23.89 |

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

### FINISHED STEEL

District mills, while reporting the usual seasonal decline anticipate a return of better demand during August, presaging an early fall upturn. Consumers continue to buy sparingly.

### OLD MATERIAL

Movement of scrap on contract is noticeably retarded, since only one or two district mills are accepting shipments. New business is negligible. Prices are unchanged, although the slowness of demand is causing an undertone of softness.

*Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:*

| | |
|---|---|
| Heavy melting steel | $7.25 to $7.75 |
| Scrap rails for melting | 10.25 to 10.75 |
| Loose sheet clipping | 3.50 to 4.00 |
| Bundled sheets | 6.75 to 7.25 |
| Cast iron borings | 3.75 to 4.25 |
| Machine shop turnings | 4.00 to 4.50 |
| No. 1 busheling | 5.75 to 6.25 |
| No. 2 busheling | 3.75 to 4.25 |
| Rails for rolling | 11.00 to 11.50 |
| No. 1 locomotive tires | 9.50 to 10.00 |
| No. 2 railroad wrought | 7.25 to 7.75 |
| Short rails | 13.00 to 13.50 |
| Cast iron carwheels | 10.50 to 11.00 |
| No. 1 machinery cast | 12.50 to 13.00 |
| No. 1 railroad cast | 11.50 to 12.00 |
| Burnt cast | 5.25 to 5.75 |
| Stove plate | 5.25 to 5.75 |
| Brake shoes | 5.25 to 5.75 |
| Agricultural malleable | 10.00 to 10.50 |
| Railroad malleable | 11.00 to 11.50 |

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The Marion Steam Shovel Co., Marion, Ohio, has shipped to the McWilliams Dredging Co., Chicago, an aluminum alloy boom for use on one of its giant dragline excavators—the first ever built for a large dragline. Aluminum alloy, which weighs about one-third as much as steel, permits this boom to be built with a weight less than one-half that of a steel boom of equivalent length and strength.

**Warehouse Prices, f.o.b. Cincinnati**

| | Base per Lb. |
|---|---|
| Plates and struc. shapes | 3.25c. |
| Bars, soft steel or iron | 3.00c. |
| New billet reinforc. bars | 3.00c. |
| Rail steel reinforc. bars | 3.00c. |
| Hoops | 3.90c. |
| Bands | 3.20c. |
| Cold-fin. rounds and hex. | 3.50c. |
| Squares | 4.00c. |
| Black sheets (No. 24) | 3.75c. |
| Galv. sheets (No. 24) | 4.25c. |
| Blue ann'l'd sheets (No. 10) | 3.30c. |
| Structural rivets | 4.20c. |
| Small rivets | 60 per cent off list |
| No. 9 ann'l'd wire, per 100 lb. | $3.00 |
| Com. wire nails, base per keg (25 kegs or more) | 2.95 |
| Cement c't'd nails, base 100 lb. keg | 2.95 |
| Chain, per 100 lb. | 10.25 |
| | Net per 100 Ft. |
| Lap-welded steel boiler tubes, 2-in. | $16.50 |
| 4-in. | 34.50 |
| Seamless steel boiler tubes, 2-in. | 17.50 |
| 4-in. | 36.00 |

# BUFFALO

## Pig Iron Market More Active—Steel Plant Operations Unchanged

BUFFALO, June 29.—There has been a renewal of interest in the pig iron market, with Eastern melters coming in for better commitments than for some time. The aggregate volume of inquiries for the week was between 5000 and 7000 tons. The Westinghouse Electric & Mfg. Co. inquired for 1000 to 1500 tons of foundry iron for the last half and covered its requirements. The Worthington Pump & Machinery Corpn. is in the market for 300 tons, and there are some other inquiries of similar size. Some of the furnaces are maintaining a $16 base on Eastern business, but it is believed that considerable business is being taken on a $15.50 base. Some of the furnaces are calling the attention of their customers to the probable increase in freight rates, which will mean a corresponding increase in the cost of producing pig iron, and this has been effective in stirring up a certain amount of business. Hanna Furnace Co. on Thursday placed an additional furnace in blast on special iron.

*Prices per gross ton, f.o.b. furnace:*

| | |
|---|---|
| No. 2 fdy., sil. 1.75 to 2.25 | $17.00 |
| No. 2X fdy., sil. 2.25 to 2.75 | 17.50 |
| No. 1 fdy., sil. 2.75 to 3.25 | 18.50 |
| Malleable, sil. up to 2.25 | 17.50 |
| Basic | 17.00 |
| Lake Superior charcoal | 25.28 |

### FINISHED STEEL

Lackawanna plant of the Bethlehem Steel Corpn. continues to operate 10 of its 24 open-hearths, with a probability of sustained operation at this rate. Republic Steel is operating four open-hearths and Wickwire Spencer three. The demand for structural steel and reinforcing bars is light, with only minor tonnages involved. A new high school at East Aurora, N. Y., will require 250 tons of structural.

### Warehouse Prices, f.o.b. Buffalo

| | Base per Lb. |
|---|---|
| Plates and struc. shapes | 3.25c. |
| Soft steel bars | 3.00c. |
| Reinforcing bars | 2.65c. |
| Cold-fin. flats and sq. | 3.65c. |
| Rounds and hex | 3.15c. |
| Cold-rolled strip steel | 5.25c. |
| Black sheets (No. 24) | 3.70c. |
| Galv. sheets (No. 24) | 4.10c. |
| Bands | 3.35c. |
| Hoops | 3.90c. |
| Blue ann'l'd sheets (No. 10) | 3.50c. |
| Com. wire nails, base per keg | $2.60 |
| Black wire, base per 100 lb | 3.20 |

| Cupola Grades: | | |
|---|---|---|
| No. 1 machinery cast | 10.00 to | 10.50 |
| Stove plate | 8.00 to | 8.25 |
| Locomotive grate bars | 7.00 to | 7.50 |
| Steel rails, 3 ft. and under | 13.00 to | 13.50 |
| Cast iron carwheels | 11.50 to | 12.00 |
| **Malleable Grades:** | | |
| Industrial | 10.00 to | 10.50 |
| Railroad | 10.00 to | 10.50 |
| Agricultural | 10.00 to | 10.50 |
| **Special Grades:** | | |
| Chemical borings | 9.00 to | 9.50 |

### OLD MATERIAL

The market is slow. Dealers have not sold a good-sized tonnage during the week. Prices offered by the leading consumer are $9 for No. 1 heavy melting steel and $7.50 for No. 2 heavy melting steel. A few carloads only have been sold at these prices.

*Prices per gross ton, f.o.b. Buffalo consumers' plants:*

| Basic Open-Hearth Grades: | | |
|---|---|---|
| No. 1 heavy melting steel | $9.00 to | $9.50 |
| No. 2 heavy melting scrap | 7.50 to | 8.00 |
| Scrap rails | 10.00 to | 10.50 |
| Hydraul. comp. sheets | 7.50 to | 8.00 |
| No. 2 hydraul. comp. sheets | 7.00 to | 7.50 |
| Hand bundled sheets | | 7.00 |
| Drop forge flashings | 7.50 to | 8.00 |
| No. 1 busheling | 7.50 to | 8.00 |
| Hvy. steel axle turnings | 8.50 to | 9.50 |
| Machine shop turnings | 4.50 to | 5.00 |
| No. 1 railroad wrought | 7.50 to | 8.00 |
| **Acid Open-Hearth Grades:** | | |
| Knuckles and couplers | 12.00 to | 12.50 |
| Coil and leaf springs | 12.00 to | 12.50 |
| Rolled steel wheels | 12.00 to | 12.50 |
| Low phos. billet and bloom ends | 13.00 to | 14.00 |
| **Electric Furnace Grades:** | | |
| Short shov. steel turnings | 6.00 to | 6.50 |
| **Blast Furnace Grades:** | | |
| Short mixed borings and turnings | 6.00 to | 6.50 |
| Cast iron borings | 6.00 to | 6.50 |
| No. 2 busheling | 4.50 to | 5.00 |
| **Rolling Mill Grades:** | | |
| Steel car axles | 15.00 to | 15.50 |
| Iron axles | 16.00 to | 16.50 |

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# Canada

## Structural Steel Is Most Active Item in Markets

TORONTO, June 29.—Pig iron demand in Canada continues to ease off, and sales for the past week were at the lowest rate for the year. Despite the fact that the beginning of third quarter is at hand, Canadian melters show no inclination toward placing contracts. Melters are adhering strictly to hand-to-mouth buying. There seems to be strong probability of curtailment in the iron melt. Pig iron production is also slipping, and imports are negligible. Prices are unchanged.

*Prices per gross ton:*

| Delivered Toronto | |
|---|---|
| No. 1 fdy., sil. 2.25 to 2.75 | $22.60 |
| No. 2 fdy., sil. 1.75 to 2.25 | 22.10 |
| Malleable | 22.60 |
| **Delivered Montreal** | |
| No. 1 fdy., sil. 2.25 to 2.75 | $24.00 |
| No. 2 fdy., sil. 1.75 to 2.25 | 23.50 |
| Malleable | 24.00 |
| Basic | 20.50 |

### STRUCTURAL STEEL

Business in this market took a slight spurt during the week, although most orders were for small tonnages. Fabricators are rapidly cleaning up backlogs, but there appears to be enough new business in prospect to maintain operations at a fairly high average. Sales for the week were mostly in lots under 500 tons each.

### OLD MATERIAL

Interest continues to lag in this market. Consumers are buying scrap only when supplies are needed for immediate use. Steel mills are not buying from dealers, although they are picking up supplies from railways. Prices are unchanged.

*Dealers' buying prices for old material:*

| | Per Gross Ton | |
|---|---|---|
| | Toronto | Montreal |
| Heavy melting steel | $7.00 | $6.00 |
| Rails, scrap | 7.00 | 6.00 |
| No. 1 wrought | 6.00 | 8.00 |
| Machine shop turnings | 2.00 | 2.00 |
| Boiler plate | 5.00 | 4.50 |
| Heavy axle turnings | 2.50 | 2.50 |
| Cast borings | 2.00 | 2.00 |
| Steel borings | 2.00 | 2.00 |
| Wrought pipe | 2.00 | 2.00 |
| Steel axles | 7.00 | 9.00 |
| Axles, wrought iron | 7.00 | 11.00 |
| No. 1 machinery cast | | 10.00 |
| Stove plate | | 8.00 |
| Standard carwheels | | 8.50 |
| Malleable | | 8.00 |
| *Per Net Ton* | | |
| No. 1 mach'ry cast | 11.00 | |
| Stove plate | 9.00 | |
| Standard carwheels | 10.00 | |
| Malleable scrap | 9.00 | |

▲▲▲

# River Shipments of Steel Decline Sharply

Shipments of steel products on the Ohio River in the Pittsburgh district during May amounted only to 59,611 net tons, according to the United States Engineer office, Pittsburgh. This is the lowest total reported since last December, and compares with 91,570 tons in April, 1931, and with 128,502 tons in May, 1930. Monongahela River shipments of steel in May declined to 35,373 tons, compared with 57,751 tons in April, 1931, and with 117,942 tons in May, 1930. Allegheny River shipments were 1330 tons in May, against 1250 tons in April.

▲▲▲

# Railroad Equipment

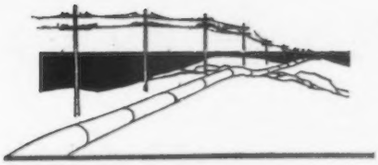
Class I railroads on June 1 had 170,165 freight cars in need of repairs, or 7.7 per cent of the number on line, according to the Car Service Division of the American Railway Association. This was an increase of 4164 cars over the number in need of repair on May 15. On June 1, 5910 locomotives were in need of classified repairs, or 10.8 per cent of the number on line, a decrease of 219 locomotives compared with the number in need of such repairs on May 15.

These railroads in the first five months of 1931 placed 6448 new freight cars in service, while in the same period last year 42,122 new freight cars were placed in service.

Norfolk & Western will rebuild 450 all-steel hopper cars at its Roanoke shops.

General American Transportation System, Chicago, has ordered 250 refrigerator cars from General American Car Co.

Fruit Growers Express is contemplating construction of 800 refrigerator cars to be built in its shops at Indiana Harbor, Ind.



## PIPE LINES

Yount-Lee Pipe Line Co., Beaumont, Tex., has been chartered to hold interest jointly with the Sun Pipe Line Co. in a $2,000,000 pipe line to be laid from east Texas to Beaumont.

McClintic-Marshall Corpn. is reported to be low bidder on 2500 tons of steel pipe for water pipe extension on Belvor Boulevard, Cleveland. This was previously reported as 1500 to 1800 tons.

Montana Power Co., Great Falls, Mont., has awarded contract to Winston Brothers, Minneapolis, for natural gas pipe line from Cut Bank to Helena, Anaconda, Butte and vicinity, about 220 miles, to cost $15,000,000.

Texas Pipe Line Co., Houston, Tex., a subsidiary of Texas Corpn., has authorized immediate construction of an addition to pipe line from Ira to Texon, Tex., for crude oil supply for Big Lake Oil Co., to cost over $150,000.

Public Service Corpn. of Mississippi, Hattiesburg, Miss., headed by Frank H. McGehee, 5214 Vanderbilt Street, Dallas, Tex., has awarded a contract to Stovall & Halle, Monroe, La., for an 8-in. natural gas pipe line from Jackson to Hattiesburg, about 86 miles, to cost over $1,000,000.

Humble Pipe Line Co., Humble Building, Houston, Tex., has awarded a contract to Oklahoma Contracting Co., Allen Building, Dallas, Tex., for an oil pipe line from Todd City to Trinity River, Tex., to cost more than $250,000.

▲ ▲ ▲

## Reinforcing Steel

### Awards Slightly Higher—New Projects in Lower Volume

LETTINGS of reinforcing steel the past week, at 5200 tons, compare with 4000 tons in the previous week and 2550 tons two weeks ago. Awards include 2000 tons for a terminal in New York for the New York Central Railroad, 1100 tons for road work in Illinois and 1000 tons for track elevation in Chicago for the Pennsylvania Railroad. Pending projects total 6150 tons, of which 2000 tons is for highway work in Louisiana and 1700 tons for electrification work for the Pennsylvania Railroad between Wilmington, Del., and Washington. Total contracts in June amounted to 14,300 tons, the smallest volume for any month this year. These compare with 24,900 tons in May and 30,950 tons in April. Awards follow:

HAVERHILL, MASS., 200 tons, State road, to Northern Steel Co.

NEW YORK, 2000 tons, St. John's Park Terminal for New York Central Railroad, to Concrete Steel Co.

CHICAGO, 1000 tons, track elevation for Pennsylvania Railroad, to Joseph T. Ryerson & Son, Inc.

CHICAGO, 800 tons, outer drive bridge, to several unnamed bidders.

SPRINGFIELD, ILL., 1100 tons, road work, to Calumet Steel Co.

CLEVELAND, 100 tons, building for Gulf Refining Co., to Patterson & Leitch Co.

### Reinforcing Bars Pending

**Inquiries for reinforcing steel bars include the following:**

READING-ANDOVER, MASS., 200 tons, State road.

WRENTHAM, MASS., 200 tons, State road.

GOSHEN, N. J., 150 tons, road construction by State Department of Institutes and Agencies; Concrete Steel Co., low bidder.

PENNSYLVANIA RAILROAD, 1700 tons, electrification between Wilmington, Del., and Washington.

PHILADELPHIA, 300 tons, sewer at Mingo Creek; P. R. & A. J. Ellis, Philadelphia, low bidder on general contract.

CLEVELAND, 800 tons, Belvor Boulevard culverts.

CHICAGO, 500 tons, Calumet pumping plant for Sanitary District.

JEFFERSON CITY, MO., 600 tons, State highway construction.

BATON ROUGE, LA., 2000 tons, State highway construction.

# This Week's News of Progress Toward Recovery

Mullins Mfg. Corpn., Salem, Ohio, manufacturer of steel automobile bodies, fenders, etc., has secured contracts for metal body stampings from two automobile manufacturers, totaling over $1,000,000, and will increase working schedule, giving employment to about 250 additional employees on day and night turns. Company has plant expansion program under way to cost close to $150,000.

* * *

Norfolk & Western Railway Co., Roanoke, Va., has scheduled rebuilding about 450 all-steel hopper coal cars at local shops, to cost about $400,000 with materials. Cars are to be completed on basis of 25 units weekly, and will give employment to 200 operatives.

* * *

Pressed Steel Car Co., McKees Rocks, Pittsburgh, will advance operations at local plant, with employment of increased working quota, and will carry out similar expansion at works of its subsidiary, Koppel Industrial Car & Equipment Co., Koppel, Pa. Company has secured business totaling about $600,000, including 250 40-ton gondola cars for a railroad in China and 803 steel underframes for refrigerator cars for Fruit Growers' Express Co. Considerable portion of latter order will be carried out at Chicago works, while first-noted contract will be handled at Pennsylvania plants, where about 300 men will be recalled.

* * *

Lapp Insulator Co., Inc., LeRoy, N. Y., manufacturer of high-tension insulators, is operating at capacity with full working force. Company recently secured an order for about 46,000 suspension-type insulators for new transmission line of New York Power & Light Co., Albany, N. Y., a subsidiary of Niagara-Hudson Power Corpn., Buffalo.

* * *

Philip D. Wagoner, president, Underwood Elliott Fisher Co., announced that the company's portable typewriter plant at Bridgeport, Conn., was entering its sixth month of full operation with sales so far in 1931 sharply ahead of those for the corresponding periods in 1929 and 1930.

* * *

Earnings of the Perfect Circle Co., Hagerstown, Ind., in May this year were the largest of any month in the history of the company, according to a statement made by C. N. Teetor, president. Since the first of the year, the company's earnings have been gradually climbing toward new peaks. May set an all-time record with earnings of $138,340, as compared with $92,654 in May of last year, or a gain of 49 per cent. With the five months' earnings, after all charges, at $348,970, or $2.15 a share, the entire year's dividend requirement of $2 a share has been met in less than half a year's time.

* * *

One of the largest machine tool orders placed in some time has been given to the Pratt & Whitney Co., Hartford, Conn., by the General Motors Corpn. While the exact amount of the order has not been announced, a statement by Clayton R. Burt, president, Pratt & Whitney Co., says that it will be sufficient to keep the Pratt & Whitney shops operating all summer with the present number of employees.

* * *

Aggregate employment and payrolls of establishments reporting to the Federal Reserve Bank of Chicago gained slightly in May, contrary to the usual trend. While the increase in totals was not large, it was participated in by six manufacturing and two non-manufacturing groups. Among manufacturing industries, seasonal expansion occurred in stone, clay and glass, food products, vehicles and paper and printing. Metals and products showed a loss from April 15 to May 15 of 2.2 per cent in wage earners and 4.4 per cent in earnings.

# Semi-Finished Steel, Raw Materials, Bolts and Rivets

## MILL PRICES OF SEMI-FINISHED STEEL

### Billets and Blooms

| | *Per Gross Ton* |
|---|---|
| Rerolling, 4-in. and under 10-in., Pittsburgh | $29.00 to $30.00 |
| Rerolling, 4-in. and under 10-in., Youngstown | 29.00 to 30.00 |
| Rerolling, 4-in. and under 10-in., Cleveland | 29.00 to 30.00 |
| Rerolling, 4-in. and under 10-in., Chicago | 31.00 to 32.00 |
| Forging quality, Pittsburgh | 35.00 to 36.00 |

### Sheet Bars
(Open-Hearth or Bessemer)

| | *Per Gross Ton* |
|---|---|
| Pittsburgh | $29.00 to $30.00 |
| Youngstown | 29.00 to 30.00 |
| Cleveland | 29.00 to 30.00 |

### Slabs
(8 in. x 2 in. and under 10 in. x 10 in.)

| | *Per Gross Ton* |
|---|---|
| Pittsburgh | $29.00 to $30.00 |
| Youngstown | 29.00 to 30.00 |
| Cleveland | 29.00 to 30.00 |

### Skelp
(F.o.b. Pittsburgh or Youngstown)

| | *Per Lb.* |
|---|---|
| Grooved | 1.65c. |
| Universal | 1.65c. |
| Sheared | 1.65c. |

### Wire Rods
(Common soft, base)

| | *Per Gross Ton* |
|---|---|
| Pittsburgh | $35.00 |
| Cleveland | 35.00 |
| Chicago | 36.00 |

## PRICES OF RAW MATERIAL

### Ores

*Lake Superior Ores, Delivered Lower Lake Ports*

| | *Per Gross Ton* |
|---|---|
| Old range Bessemer, 51.50% iron | $4.80 |
| Old range non-Bessemer, 51.50% iron | 4.65 |
| Mesabi Bessemer, 51.50% iron | 4.65 |
| Mesabi non-Bessemer, 51.50% iron | 4.50 |
| High phosphorus, 51.50% iron | 4.40 |

*Foreign Ore, c.i.f. Philadelphia or Baltimore*

| | *Per Unit* |
|---|---|
| Iron ore, low phos., copper free, 55 to 58% iron, dry, Spanish or Algerian | 8c. to 9c. |
| Iron ore, low phos., Swedish, average 68% iron | 10.00c. |
| Iron ore, basic or foundry, Swedish, average 65% iron | 9.00c. |
| Iron ore, basic and foundry, Russian, average 63% iron | 8.00c. |
| Manganese ore, washed 52% manganese, from the Caucasus | 25c. to 27c. |
| Manganese ore, African or Indian, 50 to 52% | 24c. to 26c. |
| Manganese ore, Brazilian, 46 to 48% | 22c. to 24c. |
| Tungsten ore, high grade, per unit, in 60% concentrates | $12.00 to $12.50 |

| | *Per Gross Ton* |
|---|---|
| Chrome ore, 45% $Cr_2O_3$ crude, c.i.f. Atlantic seaboard | $20.00 |
| Chrome ore, 48% $Cr_2O_3$ crude, c.i.f. Atlantic seaboard | 22.50 |

### Coke

| | *Per Net Ton* |
|---|---|
| Furnace, f.o.b. Connellsville prompt | $2.40 |
| Foundry, f.o.b. Connellsville prompt | $3.25 to 4.50 |
| Foundry, by-product, Ch'go ovens | 7.50 |
| Foundry, by-product, New England, del'd | 10.50 |
| Foundry, by-product, Newark or Jersey City, delivered | 8.70 to 9.10 |
| Foundry, by-product, Phila. | 9.00 |
| Foundry, Birmingham | 5.00 |
| Foundry, by-product, St. Louis, f.o.b. ovens | 8.00 |
| Foundry, by-product, del'd St. Louis | 9.00 |

### Coal

| | *Per Net Ton* |
|---|---|
| Mine run steam coal, f.o.b. W. Pa. mines | $1.50 to $1.60 |
| Mine run coking coal, f.o.b. W. Pa. | 1.50 to 1.60 |
| Gas coal, 3¼-in., f.o.b. Pa. mines | 1.80 to 2.00 |
| Mine run gas coal, f.o.b. Pa. mines | 1.70 to 1.80 |
| Steam slack, f.o.b. W. Pa. mines | 1.00 to 1.25 |
| Gas slack, f.o.b. W. Pa. mines | 1.10 to 1.25 |

### Ferromanganese

| | *Per Gross Ton* |
|---|---|
| Domestic, 80%, seaboard | *$80.00 to $85.00 |
| Foreign, 80%, Atlantic or Gulf port, duty paid | *80.00 to 85.00 |

*Minimum price quoted for lots of 2000 tons or more.

### Spiegeleisen

| | *Per Gross Ton Furnace* |
|---|---|
| Domestic, 19 to 21% | $28.00 to $30.00 |

### Electric Ferrosilicon

| | *Per Gross Ton Delivered* |
|---|---|
| 50% | $83.50 |
| 75% | 130.00 |

| *Per Gross Ton Furnace* | | *Per Gross Ton Furnace* | |
|---|---|---|---|
| 10% | $35.00 | 12% | $39.00 |
| 11% | 37.00 | 14 to 16% | 31.00 |

### Bessemer Ferrosilicon
**F.o.b. Jackson County, Ohio, Furnace**

| *Per Gross Ton* | | *Per Gross Ton* | |
|---|---|---|---|
| 10% | $25.00 | 13% | $29.00 |
| 11% | 26.00 | 14% | 31.00 |
| 12% | 27.00 | 15% | 33.00 |

### Silvery Iron
**F.o.b. Jackson County, Ohio, Furnace**

| *Per Gross Ton* | | *Per Gross Ton* | |
|---|---|---|---|
| 6% | $19.00 to $21.00 | 11% | $22.00 to $24.00 |
| 7% | 19.50 to 21.50 | 12% | 23.00 to 25.00 |
| 8% | 20.00 to 22.00 | 13% | 25.00 to 27.00 |
| 9% | 20.50 to 22.50 | 14% | 27.00 to 29.00 |
| 10% | 21.00 to 23.00 | 15% | 29.00 to 31.00 |

Delivered prices at Chicago are about 50c. a ton below this schedule.

### Other Ferroalloys

| | |
|---|---|
| Ferrotungsten, per lb. contained metal del'd, carloads | $1.08 |
| Ferrotungsten, less carloads | $1.15 to 1.25 |
| Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads | 11.00c. |
| Ferrochromium, 2% carbon | 17.00c. to 17.50c. |
| Ferrochromium, 1% carbon | 19.00c. to 20.00c. |
| Ferrochromium, 0.10% carbon | 24.50c. to 26.00c. |
| Ferrochromium, 0.06% carbon | 26.50c. to 28.00c. |
| Ferrovanadium, per lb. contained vanadium, f.o.b. furnace | $3.15 to $3.65 |
| Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads | $160.00 |
| Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton | 91.00 |
| Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton | 122.50 |
| Silico spiegel, per ton, f.o.b. furnace, car lots | 42.50 |
| Ton lots or less, per ton | 47.50 |
| Silico-manganese, gross ton, delivered: | |
| 2.50% carbon grade | $105.00 |
| 1% carbon grade | 115.00 |
| Spot prices | $5 a ton higher |

### Fluxes and Refractories

**Fluorspar**

| | *Per Net Ton* |
|---|---|
| Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines | $14.00 |
| No. 2 lump, Illinois and Kentucky mines | 17.00 |
| Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid | 17.00 |
| Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines | 32.50 |

**Fire Clay Brick**

| | *Per 1000 f.o.b. Works* | |
|---|---|---|
| | High-Heat Duty Brick | Intermediate Heavy Duty Brick |
| Pennsylvania | $40.00 to $43.00 | $32.00 to $35.00 |
| Maryland | 40.00 to 43.00 | 32.00 to 35.00 |
| New Jersey | 40.00 to 43.00 | ..... |
| Ohio | 40.00 to 43.00 | 32.00 to 35.00 |
| Kentucky | 40.00 to 43.00 | 32.00 to 35.00 |
| Missouri | 40.00 to 43.00 | 32.00 to 35.00 |
| Illinois | 40.00 to 43.00 | 32.00 to 35.00 |
| Ground fire clay, per ton | 6.50 | |

**Silica Brick**

| | *Per 1000 f.o.b. Works* |
|---|---|
| Pennsylvania | $45.00 |
| Chicago | 49.00 |
| Birmingham | 47.00 |
| Silica clay, per ton | 8.00 |

**Magnesite Brick**

| | *Per Net Ton* |
|---|---|
| Standard sizes, f.o.b. Baltimore and Chester, Pa. | $65.00 |
| Grain magnesite, f.o.b. Baltimore and Chester, Pa. | 40.00 |

**Chrome Brick**

| | *Per Net Ton* |
|---|---|
| Standard size | $45.00 |

## MILL PRICES OF BOLTS, NUTS, RIVETS AND SET SCREWS

### Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

| | *Per Cent Off List* |
|---|---|
| †Machine bolts | 73 and 10 |
| †Carriage bolts | 73 and 10 |
| Lag bolts | 73 and 10 |
| Plow bolts, Nos. 1, 2, 3 and 7 heads | 73 and 10 |
| Hot-pressed nuts, blank or tapped, square | 73 and 10 |
| Hot-pressed nuts, blank or tapped, hexagons | 73 and 10 |
| C.p.c. and t. square or hex. nuts, blank or tapped | 73 and 10 |
| Washers* | 7.00c. to 6.75c. per lb. off list |

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

### Bolts and Nuts

| | *Per Cent Off List* |
|---|---|
| Semi-finished hexagons nuts | 73 and 10 |
| Semi-finished hexagons castellated nuts, S.A.E. | 73 and 10 |
| Stove bolts in packages, P'gh. | 80, 10, 10, 10 and 5 |
| Stove bolts in packages, Ch'go. | 80, 10, 10, 10 and 5 |
| Stove bolts in pkgs., Cleveland. | 80, 10, 10, 10 and 5 |
| Stove bolts in bulk, P'gh. | 80, 10, 10, 10, 5 and 2½ |
| Stove bolts in bulk, Ch'go. | 80, 10, 10, 10, 5 and 2½ |
| Stove bolts in bulk, Cleveland, | 80, 10, 10, 10, 5 and 2½ |
| Tire bolts | 60, 10 and 10 |

Discounts of 73 and 10 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

### Large Rivets
(½-in. and larger)

| | *Base per 100 Lb.* |
|---|---|
| F.o.b. Pittsburgh or Cleveland | $2.75 |
| F.o.b. Chicago | 2.85 |

### Small Rivets
(7/16-in. and smaller)

| | *Per Cent Off List* |
|---|---|
| F.o.b. Pittsburgh | 70, 10 and 5 |
| F.o.b. Cleveland | 70, 10 and 5 |
| F.o.b. Chicago | 70, 10 and 5 |

### Cap and Set Screws
(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

| | *Per Cent Off List* |
|---|---|
| Milled cap screws | 80, 10, 10 and 5 |
| Milled standard set screws, case hardened, | 80 and 5 |
| Milled headless set screws, cut thread | 75 and 10 |
| Upset hex. head cap screws, U.S.S.S. thread, | 85 and 10 |
| Upset hex. cap screws, S.A.E. thread | 85 and 10 |
| Upset set screws | 80, 10 and 5 |
| Milled studs | 70 |

# Mill Prices of Finished Iron and Steel Products

## Iron and Steel Bars

*Soft Steel*

| | Base per Lb. |
|---|---|
| F.o.b. Pittsburgh mill | 1.65c. |
| F.o.b. Chicago | 1.70c. to 1.80c. |
| Del'd Philadelphia | 1.94c. to 1.99c. |
| Del'd New York | 1.98c. to 2.03c. |
| F.o.b. Cleveland | 1.65c. to 1.70c. |
| F.o.b. Lackawanna | 1.75c. to 1.80c. |
| F.o.b. Birmingham | 1.70c. to 1.75c. |
| C.i.f. Pacific ports | 2.10c. |
| F.o.b. San Francisco mills | 2.10c. |

*Billet Steel Reinforcing*

| | |
|---|---|
| F.o.b. P'gh mills, 40, 50, 60-ft. | 1.60c. to 1.65c. |
| F.o.b. Birmingham, mill lengths | 1.75c. |

*Rail Steel*

| | |
|---|---|
| F.o.b. mills, east of Chicago dist. | 1.30c. to 1.35c. |
| F.o.b. Chicago Heights mill | 1.60c. to 1.65c. |
| Del'd Philadelphia | 1.84c. to 1.89c. |

*Iron*

| | |
|---|---|
| Common iron, f.o.b. Chicago | 1.70c. to 1.80c. |
| Refined iron, f.o.b. P'gh mills | 2.75c. |
| Common iron, del'd Philadelphia | 2.09c. |
| Common iron, del'd New York | 2.14c. |

## Tank Plates

| | Base per Lb. |
|---|---|
| F.o.b. Pittsburgh mill | 1.65c. |
| F.o.b. Chicago | 1.70c. to 1.80c. |
| F.o.b. Birmingham | 1.70c. to 1.75c. |
| Del'd Cleveland | 1.83½c. |
| Del'd Philadelphia | 1.85½c. |
| F.o.b. Coatesville | 1.75c. |
| F.o.b. Sparrows Point | 1.75c. |
| F.o.b. Lackawanna | 1.75c. |
| Del'd New York | 1.93c. |
| C.i.f. Pacific ports | 2.00c. |

## Structural Shapes

| | Base per Lb. |
|---|---|
| F.o.b. Pittsburgh mill | 1.65c. |
| F.o.b. Chicago | 1.70c. to 1.80c. |
| F.o.b. Birmingham | 1.70c. |
| F.o.b. Lackawanna | 1.75c. |
| F.o.b. Bethlehem | 1.75c. |
| Del'd Cleveland | 1.83¼c. |
| Del'd Philadelphia | 1.76c. to 1.81c. |
| Del'd New York | 1.90½c. |
| C.i.f. Pacific ports | 2.05c. |

## Hot-Rolled Hoops, Bands and Strips

| | Base per Lb. |
|---|---|
| 6 in. and narrower, Pittsburgh | 1.65c. |
| Wider than 6 in., P'gh | 1.55c. |
| 6 in. and narrower, Chicago | 1.75c. |
| Wider than 6 in., Chicago | 1.65c. |
| Cooperage stock, P'gh | 1.75c. to 1.85c. |
| Cooperage stock, Chicago | 1.85c. to 1.95c. |

## Cold-Finished Steel

| | Base per Lb. |
|---|---|
| Bars, f.o.b. Pittsburgh mill | 2.10c. |
| Bars, f.o.b. Chicago | 2.10c. |
| Bars, Cleveland | 2.10c. |
| Bars, Buffalo | 2.10c. |
| Shafting, ground, f.o.b. mill | *2.45c. to 3.40c. |
| Strips, P'gh | 2.15c. |
| Strips, Cleveland | 2.15c. |
| Strips, deliv'd Chicago | 2.43c. |
| Strips, Worcester | 2.30c. |
| Fender stock, No. 20 gage, Pittsburgh or Cleveland | 3.20c. |

*According to size.

## Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland)

*To Manufacturing Trade*

| | Base per Lb. |
|---|---|
| Bright wire | 2.20c. |
| Spring wire | 3.20c. |

*To Jobbing Trade*

| | Base per Lb. |
|---|---|
| Smooth annealed wire | 2.25c. |
| Smooth galvanized wire | 2.70c. |
| Polished staples | 2.25c. |
| Galvanized staples | 2.50c. |
| Barbed wire, galvanized | 2.45c. |
| Woven wire fence, per net ton | $60.00 |

| | Base per Keg |
|---|---|
| Standard wire nails | $1.80 |
| Smooth coated nails | 1.80 |
| Galvanized nails | 3.80 |

*To Retail Trade*

| | Base per Lb. |
|---|---|
| Bright wire | 2.30c. |
| Smooth annealed wire | 2.40c. |
| Smooth galvanized wire | 2.90c. |

| | Base per Keg |
|---|---|
| Standard wire nails | $1.90 |
| Cement coated nails | 1.90 |
| Galvanized nails | 3.90 |

| | Base per Lb. |
|---|---|
| Polished staples | 2.45c. |
| Galvanized staples | 2.70c. |
| Barbed wire, galvanized | 2.65c. |
| Woven wire fence, per net ton | $65.00 |

*Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.*

## Sheets

*Hot-rolled*

| | Base per Lb. |
|---|---|
| No. 10, f.o.b. Pittsburgh | 1.70c. |
| No. 10, f.o.b. Chicago mills | 1.80c. |
| No. 10, del'd Philadelphia | 1.99c. |
| No. 10, f.o.b. Birmingham | 1.85c. |

*Hot-Rolled Annealed*

| | |
|---|---|
| No. 24, f.o.b. Pittsburgh | 2.40c. |
| No. 24, f.o.b. Chicago mills | 2.50c. |
| No. 24, del'd Philadelphia | 2.69c. |
| No. 24, f.o.b. Birmingham | 2.55c. |

*Heavy Cold-Rolled*

| | |
|---|---|
| No. 10 gage, f.o.b. Pittsburgh | 2.35c. |
| No. 10 gage, f.o.b. Chicago mills | 2.45c. |
| No. 10 gage, del'd Philadelphia | 2.64c. |
| No. 10 gage, f.o.b. Birmingham | 2.50c. |

*Light Cold-Rolled*

| | |
|---|---|
| No. 20 gage, f.o.b. Pittsburgh | 2.95c. |
| No. 20 gage, f.o.b. Chicago mills | 3.05c. |
| No. 20 gage, del'd Philadelphia | 3.24c. |
| No. 20, f.o.b. Birmingham | 3.10c. |

*Automobile Body Sheets*

| | |
|---|---|
| No. 20, f.o.b. Pittsburgh | 3.10c. |

*Steel Furniture Sheets*

| | |
|---|---|
| No. 10, f.o.b. Pittsburgh | 2.75c. |
| No. 20, f.o.b. Pittsburgh | 3.35c. |

(Prices on furniture stock include stretcher leveling but not resquaring).

*Galvanized Sheets*

| | |
|---|---|
| No. 24, f.o.b. Pittsburgh | 2.90c. |
| No. 24, f.o.b. Chicago Mills | 3.00c. |
| No. 24, del'd Philadelphia | 3.19c. |
| No. 24, f.o.b. Birmingham | 3.05c. |

*Long Ternes*

| | |
|---|---|
| No. 24, unassorted, 8-lb. coating, f.o.b. P'gh | 3.15c. |

*Vitreous Enameling Stock*

| | |
|---|---|
| No. 10, f.o.b. Pittsburgh | 3.10c. |
| No. 20, f.o.b. Pittsburgh | 3.60c. |

*Tin Mill Black Plate*

| | |
|---|---|
| No. 28, f.o.b. Pittsburgh | 2.55c. to 2.65c. |
| No. 26, Chicago mills | 2.65c. to 2.75c. |

## Tin Plate

| | Base per Box |
|---|---|
| Standard cokes, f.o.b. P'gh district mills | $5.00 |
| Standard cokes, f.o.b. Gary | 5.10 |

## Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

| | |
|---|---|
| 8-lb. coating I.C. $10.30 | 25-lb. coating I.C. $15.20 |
| 15-lb. coating I.C. 12.90 | 30-lb. coating I.C. 16.00 |
| 20-lb. coating I.C. 14.00 | 40-lb. coating I.C. 17.80 |

## Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

| S.A.E. Series Numbers | | Alloy Differential |
|---|---|---|
| 2000 | (½% Nickel) | $0.25 |
| 2100 | (1¼% Nickel) | 0.55 |
| 2300 | (3½% Nickel) | 1.50 |
| 2500 | (5% Nickel) | 2.25 |
| 3100 | Nickel Chromium | 0.55 |
| 3200 | Nickel Chromium | 1.35 |
| 3300 | Nickel Chromium | 3.80 |
| 3400 | Nickel Chromium | 3.20 |
| 4100 | Chromium Molybdenum (0.15 to 0.25 Molybdenum) | 0.50 |
| 4100 | Chromium Molybdenum (0.25 to 0.40 Molybdenum) | 0.70 |
| 4600 | Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel) | 1.05 |
| 5100 | Chromium Steel (0.60 to 0.90 Chromium) | 0.35 |
| 5100 | Chromium Steel (0.80 to 1.10 Chromium) | 0.45 |
| 5100 | Chromium Spring Steel | 0.20 |
| 6100 | Chromium Vanadium Bar | 1.20 |
| 6100 | Chromium Vanadium Spring Steel | 0.95 |
| 9250 | Silicon Manganese Spring Steel (flats) | 0.25 |
| | Rounds and squares | 0.50 |
| | Chromium Nickel Vanadium | 1.50 |
| | Carbon Vanadium | 0.95 |

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

## Rails

| | Per Gross Ton |
|---|---|
| Standard, f.o.b. mill | $43.00 |
| Light (from billets), f.o.b. mill | 34.00 |
| Light (from rail steel), f.o.b. mill | 32.00 |

## Track Equipment

| | Base per 100 Lb. |
|---|---|
| Spikes, ⅝ in. and larger | $2.70 |
| Spikes, ½ in. and larger | 2.70 |
| Spikes, boat and barge | $2.90 |
| Tie plate, steel | 1.95 |
| Angle bars | 2.75 |
| Track bolts, to steam railroads | $3.80 to 4.00 |
| Track bolts, to jobbers, all sizes, per 100 count | 73 per cent off list |

## Welded Pipe

**Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills**

*Butt Weld*

| Steel Inches | Black | Galv. | Iron Inches | Black | Galv. |
|---|---|---|---|---|---|
| ⅛ | 47 | 21½ | ¼ and ⅜ | +11 | +36 |
| ¼ to ⅜ | 53 | 27½ | ½ | 23 | 5 |
| ½ | 58 | 44½ | ¾ | 28 | 11 |
| ¾ | 62 | 50½ | 1 and 1¼ | 31 | 15 |
| 1 to 3 | 64 | 52½ | 1½ and 2 | 35 | 18 |

*Lap Weld*

| | | | | | |
|---|---|---|---|---|---|
| 2 | 57 | 45½ | 2 | 23 | 9 |
| 2½ to 6 | 61 | 49½ | 2½ to 3½ | 28 | 13 |
| 7 and 8 | 58 | 45½ | 4 to 6 | 30 | 17 |
| 9 and 10 | 56 | 43½ | 7 and 8 | 29 | 16 |
| 11 and 12 | 55 | 42½ | 9 to 12 | 26 | 11 |

*Butt Weld, extra strong, plain ends*

| | | | | | |
|---|---|---|---|---|---|
| ⅛ | 43 | 26½ | ¼ and ⅜ | +13 | +48 |
| ¼ to ⅜ | 49 | 32½ | ½ | 23 | 7 |
| ½ | 55 | 44½ | ¾ | 28 | 12 |
| ¾ | 60 | 49½ | 1 to 2 | 34 | 18 |
| 1 to 1½ | 62 | 51½ | | | |
| 2 to 3 | 63 | 52½ | | | |

*Lap Weld, extra strong, plain ends*

| | | | | | |
|---|---|---|---|---|---|
| 2 | 55 | 44½ | 2 | 29 | 13 |
| 2½ to 4 | 59 | 48½ | 2½ to 4 | 34 | 20 |
| 4½ to 6 | 58 | 47½ | 4½ to 6 | 33 | 19 |
| 7 to 8 | 54 | 41½ | 7 and 8 | 31 | 17 |
| 9 and 10 | 47 | 34½ | 9 to 12 | 21 | 8 |
| 11 and 12 | 46 | 33½ | | | |

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discounts of 5 and 2½%, and on galvanized by 1½ points, with supplementary discounts of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

## Boiler Tubes

**Base Discounts, f.o.b. Pittsburgh**

| Steel | | Charcoal Iron | |
|---|---|---|---|
| 2 in. and 2¼ in. | 38 | 1½ in. | 1 |
| 2½ in.—2¾ in. | 46 | 1¾ in. | 8 |
| 3 in. | 52 | 2 in.—2¼ in. | 13 |
| 3¼ in.—3¾ in. | 54 | 2½ in.—2¾ in. | 16 |
| 4 in. | 57 | 3 in. | 17 |
| 4½ in. to 6 in. | 46 | 3¼ in. to 3½ in. | 18 |
| | | 4 in. | 20 |
| | | 4½ in. | 21 |

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

*Standard Commercial Seamless Boiler Tubes*

*Cold Drawn*

| | | | |
|---|---|---|---|
| 1 in. | 61 | 3 in. | 46 |
| 1¼ to 1½ in. | 53 | 3¼ to 3½ in. | 48 |
| 1¾ in. | 37 | 4 in. | 51 |
| 2 to 2¾ in. | 32 | 4½, 5 and 6 in. | 40 |
| 2½ to 2¾ in. | 40 | | |

*Hot Rolled*

| | | | |
|---|---|---|---|
| 2 and 2¼ in. | 38 | 3¼ to 3½ in. | 54 |
| 2½ and 2¾ in. | 46 | 4 in. | 57 |
| 3 in. | 52 | 4½, 5 and 6 in. | 46 |

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

## Seamless Mechanical Tubing

| | Per Cent Off List |
|---|---|
| Carbon, 0.10% to 0.30% base (carloads) | 55 |
| Carbon, 0.30% to 0.40% base | 50 |

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

# ▲▲▲ Non-Ferrous Metal Markets ▲▲▲

## All Metals Sharply Higher and Active—Copper at 9c.

NEW YORK, June 30.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

| | June 30 | June 29 | June 27 | June 26 | June 25 | June 24 |
|---|---|---|---|---|---|---|
| Lake copper, New York | 9.12½ | 9.12½ | 8.87½ | 8.87½ | 8.87½ | 8.62½ |
| Electrolytic copper, N. Y.* | 8.75 | 8.75 | 8.50 | 8.50 | 8.50 | 8.25 |
| Straits tin, spot, N. Y. | 25.20 | 26.00 | 26.75 | 25.50 | 25.20 | 24.35 |
| Zinc, East St. Louis | 3.90 | 3.85 | 3.75 | 3.65 | 3.60 | 3.50 |
| Zinc, New York | 4.25 | 4.20 | 4.10 | 4.00 | 3.95 | 3.85 |
| Lead, St. Louis | 4.22½ | 4.22½ | 4.22½ | 4.22½ | 4.22½ | 4.07½ |
| Lead, New York | 4.40 | 4.40 | 4.40 | 4.40 | 4.40 | 4.25 |

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

▲▲▲

### COPPER

Stimulated further by the Hoover moratorium proposal, all metals, led by copper, have advanced sharply during the week. Three more increases in the quotation of Copper Exporters, Inc., have culminated in a price of 9.27½c., c.i.f. usual European ports, followed automatically by a quotation of 9c. for electrolytic copper, delivered in the Connecticut Valley. Sales have been heavy to both foreign and domestic users. It is estimated that the June sales to foreign countries have totaled 77,000 gross tons, or the largest for any month in over a year. Domestic sales last week were heavy also, the total for June being conservatively put at about 95,000 tons. Foreign buying has been for delivery through August, and it is stated that consumers are not yet fully covered. Domestic buying has comprised delivery into next January, with the most sellers confining the limit to October at present prices.

Meetings of leading producers in New York recently, having under consideration further curtailment of production, are reported not to have accomplished much. It is believed that more reduction in output must come before sound conditions rule, and some results are expected in the near future.

Lake copper has been active at higher prices, which now stand at 9c. to 9.12½c., delivered. The market in general today has been quiet, due to the delay in the debt suspension negotiations with France.

### COPPER AVERAGES

The average price of Lake copper, based on daily quotations in THE IRON AGE, is 8.49c. a lb. for June, delivered New York. The average price of electrolytic copper is 8.05c., refinery, or 8.30c., delivered in the Connecticut Valley.

### TIN

Buying of Straits tin has been heavy in this market the last week, a large share of it being speculative. Some general consumers and tin plate makers, however, were active buyers, with purchases involving delivery into early next year. There have also been heavy speculative purchases in London, and the buying in both markets has been due largely to the strength in other metals, all induced by the international negotiations. Due to less favorable news from abroad, the market here and in London sold off yesterday and today, and prices are lower in both markets. In London spot standard was quoted today at £114 2s. 6d., future standard at £116 and spot Straits at £115 12s. 6d. The Singapore market today was £116 17s. 6d. Spot Straits tin here today was quoted at 25.20c., New York, with little buying. Contrary to custom, the market was active on Saturday, with heavy sales at the highest prices on this movement. Yesterday initial sales were at 26.62½c., closing at 26c., with lower prices today. The slight reaction is regarded as rather temporary. Stocks of tin in British warehouses as of Saturday, June 27, were 32,192 tons, an increase of 298 tons for the week. Deliveries into American consumption during June were 5185 tons, considerably lower than in recent months.

### LEAD

For four days last week, the buying of lead was so heavy that the total sales of leading producers amounted to approximately 16,000 tons, which is said to be the largest total for any week in the history of the industry. Practically every line of consumption was represented by purchases of very large lots. Since then

#### New York, Chicago or Cleveland Warehouse

*Delivered Prices, Base per Lb.*

| | |
|---|---|
| High brass | 16.25c. |
| *Copper, hot rolled, base sizes | 18.87½c. |
| *Seamless Tubes*— | |
| Brass | 21.12½c. |
| Copper | 21.37½c. |
| *Brass Rods* | 14.50c. |
| *Brazed Brass Tubes* | 25.12½c. |

*Extra for cold-rolled, 3c. per lb.

#### New York Warehouse

*Delivered Prices, Base per Lb.*

| | |
|---|---|
| *Zinc sheets (No. 9), casks* | 9.00c. to 9.50c. |
| *Zinc sheets, open* | 10.00c. to 10.50c. |

#### Metals from New York Warehouse

*Delivered Prices, per Lb.*

| | |
|---|---|
| Tin, Straits pig | 27.50c. to 28.50c. |
| Tin, bar | 29.50c. to 31.50c. |
| Copper, Lake | 11.00c. to 11.50c. |
| Copper, electrolytic | 10.00c. to 10.50c. |
| Copper, casting | 9.75c. to 10.25c. |
| Zinc, slab | 4.50c. to 5.50c. |
| Lead, American pig | 5.25c. to 6.25c. |
| Lead, bar | 7.00c. to 8.00c. |
| Antimony, Asiatic | 9.50c. to 10.50c. |
| Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) | 20.00c. to 22.00c. |
| Alum. ingots, No. 12 alloy | 19.00c. to 21.00c. |
| Babbitt metal, commercial grade | 20.00c. to 30.00c. |
| Solder, ½ and ½ | 18.25c. to 19.25c. |

#### Metals from Cleveland Warehouse

*Delivered Prices, per Lb.*

| | |
|---|---|
| Tin, Straits pig | 30.75c. |
| Tin, bar | 32.75c. |
| Copper, Lake | 9.88c. |
| Copper, electrolytic | 9.75c. |
| Copper, casting | 9.50c. |
| Zinc, slab | 5.50c. to 5.75c. |
| Lead, American pig | 5.00c. |
| Lead, bar | 7.75c. |
| Antimony, Asiatic | 10.00c. |
| Babbitt metal, medium grade | 15.00c. |
| Babbitt metal, high grade | 38.75c. |
| Solder, ½ and ½ | 20.50c. |

#### Old Metals, Per Lb., New York

*Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.*

| | Dealers' Buying Prices | Dealers' Selling Prices |
|---|---|---|
| Copper, hvy. crucible | 6.50c. | 7.25c. |
| Copper, hvy. and wire | 6.25c. | 7.00c. |
| Copper, light and bottoms | 5.25c. | 6.00c. |
| Brass, heavy | 3.50c. | 4.25c. |
| Brass, light | 2.75c. | 3.75c. |
| Hvy. machine composition | 5.25c. | 6.00c. |
| No. 1 yel. brass turnings | 3.75c. | 4.50c. |
| No. 1 red brass or compos. turnings | 4.50c. | 5.25c. |
| Lead, heavy | 2.75c. | 3.25c. |
| Zinc | 1.25c. | 1.75c. |
| Sheet aluminum | 9.50c. | 11.50c. |
| Cast aluminum | 3.50c. | 6.00c |

the market has turned rather quiet, but prices are firm at the recent advances, with the quotation of the leading interest established at 4.40c., New York, and that of the independent producers at 4.22½c., St. Louis. Metal for delivery into August was involved with the principal sales for late June and all of July.

## ZINC

Prime Western zinc has not been slow in following the advance established in other metals. Increases have been almost a daily occurrence, with sales made today at 3.90c., East St. Louis, or 4.25c., New York. This is an advance of 40 points during the week. The total turnover has not been as heavy as in some other metals, but substantial sales are reported, principally for July and August, the latter month demanding a premium of about five points. Galvanizers have been important buyers. Besides the international negotiations, the projected curtailment of output of the metal has also been a factor in the stronger market.

Ore prices have been advanced, but not as rapidly as those of the metal. Quotations now stand at $21 to $22 a ton, an increase of $1. Last week smelters were able to get only 1930 tons at the advance, indicating that stocks are strongly held. Shipments last week were about 3500 tons with production estimated at also 3500 tons, leaving stocks at approximately 66,250 tons.

## ANTIMONY

This market is not active, but is stronger in sympathy with other metals. Chinese metal is quoted at 7.05c., New York, duty paid, with futures at approximately the same level.

## NICKEL

Electrolytic cathodes are quoted at 35c. a lb., and shot and ingot nickel from remelted electrolytic at 36c. a lb. for single lots, spot shipment.

## ALUMINUM

Virgin metal, 98 to 99 per cent pure, is quoted at 22.90c. a lb. delivered, according to published prices.

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Chevrolet Motor Co., Detroit, has started to operate its new bumper manufacturing plant, which was completed last month. The plant, which has a total floor space of 35,000 sq. ft., has an average monthly capacity of 70,000 sets of bumpers, and, according to W. S. Knudsen, president and general manager, it is expected that a full normal schedule will be in effect within the next few weeks. Including the new bumper plant, Chevrolet now has 21 domestic factories.

# FABRICATED STRUCTURAL STEEL

## Awards of 20,000 Tons Include 2100-Ton Subway Concourse—2400-Ton Post Office Is Largest New Project

NEW fabricated steel projects, smallest since early in June, total 19,000 tons, compared with 44,000 tons a week ago. Included are 2400 tons for a Louisville, Ky., Post Office, 2000 tons for a municipal auditorium in Worcester, Mass., 1500 tons for a newspaper building in Cincinnati, and 1000 tons for a church on East Thirty-fifth Street, New York.

Awards of 20,000 tons are the smallest total since the last week in May, and include 2100 tons for a subway concourse at City Hall, Philadelphia, 1910 tons for bridges in Philadelphia for the Reading Railroad, and 1100 tons for a generator station in New York for the Consolidated Gas Co. Awards follow:

### North Atlantic States

BOSTON, 100 tons, International Harvester Co., warehouse, to Boston Structural Steel Co., Inc.

WARREN, R. I., 100 tons, Post Office, to Palmer Steel Co.

ANDOVER, MASS., 110 tons, bridge, to McClintic-Marshall Corpn.

GERMANTOWN, N. Y., 350 tons, State highway bridges, to Lackawanna Steel Construction Corpn.

NEW YORK CENTRAL RAILROAD, 115 tons, bridge at Canton, N. Y., to Shoemaker Bridge Co.

STATE OF NEW YORK, 250 tons, highway bridge, to Lackawanna Steel Construction Corpn.

SCHENECTADY, N. Y., 515 tons, running shed and pipe shops for American Locomotive Co., to American Car & Foundry Co.

IRVINGTON, N. Y., 445 tons, Irvington House for cardiac children, to Bethlehem Fabricators, Inc.

NEW YORK, 1100 tons, generator station at Hunts Point, for Consolidated Gas Co., to American Bridge Co.

NEW YORK, 375 tons, church in Queens, to George A. Just.

NEW YORK, 100 tons, alterations to Williamsburg Bridge, to National Bridge Works.

STATE OF NEW JERSEY, 200 tons, Union County highway bridge, to L. F. Box Co.

TEANECK, N. J., 120 tons, highway bridge, to McClintic-Marshall Corpn.

LAKEHURST, N. J., 135 tons, alterations to dirigible hangar, to Seacoast Iron Co.

STATE OF NEW JERSEY, 240 tons, State highway route 4, section 3, at Englewood, to Harris Structural Co.

HOLMDEL, N. J., 245 tons, Nurses' Home, to Richard deCou.

READING COMPANY, 1910 tons, bridges between Worcester and Musgrave Streets, Philadelphia, to McClintic-Marshall Corpn.

PHILADELPHIA, 2100 tons, subway concourse at City Hall, to McClintic-Marshall Corpn.

VILLANOVA, PA., 440 tons, gymnasium and fieldhouse, Villanova College, to Fort Pitt Bridge Works.

BALTIMORE, 320 tons, Enoch Pratt Free Library, to Dietrich Brothers.

UNADILLA, N. Y., 125 tons, grade crossing elimination, for Delaware & Hudson Railroad, to American Bridge Co.

ERIE, PA., 500 tons, refrigerator plant for General Electric Co., to Austin Co.

### Central States

CLEVELAND, 1135 tons, tanks for Gulf Refining Co., to McClintic-Marshall Corpn.

BEVERLY, OHIO, 125 tons, State highway bridge, to Massillon Bridge & Structural Co.

CANTON, OHIO, 110 tons, Mahoning Road bridge, to Massillon Bridge & Structural Co.

DAYTON, OHIO, 500 tons, bomb proofs for Wright Field, to Worden-Allen Co.

KENOSHA, WIS., 300 tons, subway for Chicago & North Western grade separation, to Worden-Allen Co.

BESSEMER, MICH., 200 tons, high school, to Worden-Allen Co.

STATE OF ILLINOIS, 2900 tons, bridges; 1300 tons to Clinton Bridge Co., 800 tons to International Steel & Iron Co., 100 tons to McClintic-Marshall Corpn., remainder to various bidders.

MINNEAPOLIS, 450 tons, an unnamed project, to William Broff Boiler & Mfg. Co.

### The South

DANVILLE, TENN., 3000 tons, Tennessee River bridge, to Virginia Bridge & Iron Co.

CHARLESTON, W. VA., 300 tons, warehouse for Hubbard Grocery Co., to Pittsburgh Bridge & Iron Works.

ANNISTON, ALA., 150 tons, Court House, to Virginia Bridge & Iron Co.

HODGE, LA., 460 tons, mill addition for Southern Advance Paper Co., to Ingalls Iron Works.

### Canada

NEW WESTMINSTER, B. C., 350 tons, bridge for Canadian National Railways, to Dominion Bridge Co.

QUEBEC, 150 tons, Nurses' Home and laundry, to Eastern Canada Steel Co.

MONTREAL, 300 tons, school, to Canadian Structural Steel Works Co., Ltd.

### STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

#### North Atlantic States

BOSTON, 300 tons, section B, East Boston tunnel.

BOSTON, 231 tons, Dorchester intermediate school.

WESTON, MASS., 115 tons, standpipe.

QUINCY, MASS., 268 tons, Government hangar extension.

WORCESTER, MASS., 2000 tons, municipal auditorium.

PHILADELPHIA, 150 tons, apartment building at Fiftieth and Folsom Streets.

FALLSINGTON, PA., 100 tons, high school auditorium and gymnasium.

PROVIDENCE, R. I., unstated tonnage, completion of Providence County Court House.

STATE OF NEW JERSEY, 6000 tons, express highway on route 25; Kavanagh Construction Co., Bayonne, N. J., low bidder on general contract.

ERIE RAILROAD, 500 tons, bridge at Hillburn, N. Y.

EAST AURORA, N. Y., 250 tons, high school.

WARWICK, N. Y., 1500 tons, State training school for boys; former bids rejected.

NEW YORK, 1000 tons, Community Church, East Thirty-fifth Street, near Park Avenue.

ALFRED, N. Y., 125 tons, Alfred University.

TONAWANDA, N. Y., 200 tons, Erie County bridge.

PITTSBURGH, 4300 tons, South Tenth Street bridge; bids open July 21.

**The South**

LOUISVILLE, KY., 2400 tons, Post Office; Pike & Cook., Minneapolis, general contractor.

LAKE CHARLES, LA., 1000 tons, dock sheds; P. Olivier & Son, Lake Charles, low bidders on general contract.

VICKSBURG, MISS., 125 tons, 20 pontoons for United States Engineer; bids July 30.

**Central States**

CINCINNATI, 1500 tons, *Times Star* building.

CLEVELAND, 1400 tons additional, Lorain Central bridge.

EVANSTON, ILL., 800 tons, 400 tons each for Thorne auditorium and music building for Northwestern University.

MADISON, WIS., 1200 tons, United States Forest Products Laboratory.

CHICAGO, 450 tons, pump and blower house for Sanitary District.

MILWAUKEE, 400 tons, Matthew Keenan Health Center.

JEFFERSON CITY, MO., 228 tons, highway bridges for Missouri Highway Commission.

ST. LOUIS, 1100 tons, columns for Illinois Terminal warehouse.

**Canada**

SASKATOON, SASK., 1000 tons, traffic bridge over south Saskatchewan River for City Council.

TORONTO, 150 tons, addition to Morse Street school.

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## Detroit Scrap Market Has Stronger Tone

DETROIT, June 30.—Despite meager purchases by consumers, there is a stronger tone to the scrap market, evidenced by higher prices paid by dealers in the past week. Heavy melting steel and hydraulic bundles were the chief items in these transactions, with the latter bringing well over $7. For the second consecutive week, borings and turnings have advanced 25c. a ton, as the available supply of these grades diminishes.

A steel consumer is shipping a boat load of borings and turnings from Detroit and a cargo of heavy steel scrap, taking advantage of present low prices to lay down this material for future use. The local steel plant is said to be making only sporadic purchases and probably will not be in the market for large tonnages for some time.

Dealers are of the opinion that there will be little consumer buying until August, but are convinced that the turn has come and that the next change will be upward.

*Dealers' buying prices per gross ton, f.o.b. cars, Detroit:*

| | | |
|---|---|---|
| Hvy. melting and shov. steel | $6.75 to | $7.25 |
| Borings and short turnings | 4.00 to | 4.50 |
| Long turnings | 3.25 to | 3.75 |
| No. 1 machinery cast | 8.25 to | 8.75 |
| Automotive cast | 11.00 to | 11.50 |
| Hydraul. comp. sheets | 6.50 to | 7.00 |
| Stove plate | 5.75 to | 6.25 |
| New No. 1 busheling | 5.50 to | 6.00 |
| Old No. 2 busheling | 2.50 to | 3.00 |
| Sheet clippings | 3.50 to | 4.00 |
| Flashings | 5.75 to | 6.25 |

## Steel Castings Orders Declined in May

WASHINGTON, June 30.—Orders for commercial steel castings in May totaled 39,044 net tons, or 26.8 per cent of capacity of the 131 establishments reporting to the Bureau of the Census, compared with 46,007 net tons in April. The output declined to 43,141 tons, or 29.6 per cent of capacity, against 48,250 tons, or 33.1 per cent of capacity, in April.

Orders in May were distributed as follows: Railroad specialties, 11,306 tons, and miscellaneous castings, 27,738 tons. Production consisted of 12,071 tons of railroad specialties and 31,070 tons of miscellaneous castings.

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## Public Works Awards $46,808,286 for Week

WASHINGTON, June 30.—Contract awards for public and semi-public works construction projects totaling $46,808,286 were reported to the Public Works Section of the President's Emergency Committee for Employment last week. Awards since Dec. 1 total $1,815,288,788.

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Duriron Co., Inc., Dayton, Ohio, recently unveiled a memorial flagpole to Peirce Davies Schenck, founder of the company.

## Cleveland Iron and Steel Market

(*Concluded from page* 61)

ore in blast May 31, a decrease of nine for the month.

### BOLTS AND NUTS

The additional 10 per cent discount on bolts and nuts reported last week has been generally adopted and some third quarter contracts taken on the old basis have been revised to the new 73 and 10 per cent discount. Specifications fell off in June, and an improvement in the demand is not expected during July and August. Operation of the industry is estimated at 30 to 35 per cent.

### OLD MATERIAL

Activity is confined to limited buying by dealers for delivery to Valley mills. Dealers are paying $10 for No. 1 heavy melting steel, $6.75 to $7 for machine shop turnings and $9.50 to $9.75 for compressed sheet steel for delivery in the Valley district. One local mill is taking a small amount of blast furnace scrap, but no steelmaking scrap. Prices are holding at the recent reductions.

*Prices per gross ton delivered consumers' yards:*

| | | |
|---|---|---|
| **Basic Open-Hearth Grades:** | | |
| No. 1 heavy melting steel | $8.50 to | $9.00 |
| No. 2 heavy melting steel | 8.00 to | 8.50 |
| Compressed sheet steel | 7.50 to | 8.00 |
| Light bundled sheet stampings | 6.50 to | 7.00 |
| Drop forge flashings | 6.75 to | 7.00 |
| Machine-shop turnings | 5.00 to | 5.50 |
| Short shoveling turnings | 6.25 to | 6.75 |
| No. 1 railroad wrought | 9.50 to | 10.00 |
| No. 2 railroad wrought | 10.00 to | 10.50 |
| No. 1 busheling | 6.75 to | 7.00 |
| Pipes and flues | 5.50 to | 6.00 |
| Steel axle turnings | 7.50 to | 8.00 |
| **Acid Open-Hearth Grades:** | | |
| Low phos., billet bloom and slab crops | 14.00 to | 14.50 |
| **Blast Furnace Grades:** | | |
| Cast iron borings | 6.25 to | 6.75 |
| Mixed borings and short turnings | 6.25 to | 6.75 |
| No. 2 busheling | 6.00 to | 6.25 |
| **Cupola Grades:** | | |
| No. 1 cast | 10.00 to | 10.50 |
| Railroad grate bars | 6.00 to | 6.50 |
| Stove plate | 6.00 to | 6.50 |
| Rails under 3 ft. | 15.00 to | 15.50 |
| **Miscellaneous:** | | |
| Rails for rolling | 13.00 to | 13.50 |
| Railroad malleable | 11.00 to | 11.25 |

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## Plate Fabrication Work Lower in May

WASHINGTON, June 30.—Declining 3751 tons, orders for fabricated steel plate in May totaled 26,165 tons, compared with 29,916 tons in April, according to reports received by the Bureau of the Census from 51 manufacturers.

The May bookings were distributed as follows: Oil storage tanks, 2411 tons; refinery materials and equipment, 934 tons; tank cars, 337 tons; gas holders, 1866 tons; blast furnaces, 230 tons, and miscellaneous, 20,387 tons.

## "Getting Back to Arithmetic"

(*Concluded from page 5*)

ceed along different lines. For instance, I think that you will agree that the investment in improved equipment means moving out a portion of the working capital of the business into the fixed asset position, thereby reducing the working capital and increasing the fixed assets, although probably not increasing the fixed assets by the entire amount which has been taken from the working capital, inasmuch as the improved equipment will in all likelihood displace other equipment which has not been completely charged off and which will, therefore, have to be charged off when it is displaced.

We probably will agree also that to restore the equilibrium which should exist between the working capital and the total investment in the business, the profits must be held back and plowed into the business or additional capital must be produced and put into the business. If the amount is substantial, presumably the only reasonable method to get it back into the business would be by a contribution of capital. If, of course, the amount is moderate and the outlook is perfectly clear that the new equipment will produce profits with which to pay for itself, it is quite possible for the producer to purchase the equipment with the assistance of finance companies.

At this point, you and I will undoubtedly agree to disagree, for it is my firm belief that unless the amount involved is small in proportion to the total worth of the producer and can be paid in the immediate future out of current earnings, a commercial bank cannot properly take part in the operation except in a minor way and pending the funding of the cost or the contribution of additional capital.

I believe firmly that a commercial bank should not wittingly permit its funds to be involved in a credit operation which can be prolonged beyond the six-month period except with the approval of the bank and that the attempt to use the credit made available by the commitment of funds in the hands of commercial banks should not be used for longer term operations. We believe also that if this principle is followed, other means have been and will be found to provide the necessary assistance to business with the banks contributing perhaps their own proper part of the program and that from every point of view, both banks and business will be very much better off for having adhered strictly to this principle.

**JAMES W. KNOX,**
**President,**
**The First National Bank,**
**Hartford, Conn.**

## Consumer Desires Are Unlimited

THAT old saying of the sporting fraternity, "The bigger they are the harder they fall," applies perfectly to business cycles. Several years of unequaled prosperity cause that unknown individual, the ultimate consumer, to buy far beyond his immediate needs. When he sees a depression in the offing, he can stop buying as long as his surplus of materials will carry him; the more he bought, the longer he can wait.

If the ultimate consumer decides that a roof over his head and three square meals a day are all he needs to be happy, our industries will never again see prosperity. On the other hand, if the ultimate consumer decides that the old automobile should be replaced with a new one, that he needs some more clothing and various luxuries, if he decides to buy airplanes, radios and any other new device which appeals to him, business will soon be booming.

Nearly every ultimate consumer would like to be the proud owner of the best automobile made, and he would like to own the finest home and wear the best apparel. He buys what he can afford, and sometimes he buys more than he can afford, but he will always buy again just as soon as he feels that he has the necessary money to pay for his purchases. The ambition to have something better is what makes business.

The luxury of today becomes the necessity of tomorrow. As soon as the price of any luxury is brought down to where the ultimate consumer can buy it, it goes into quantity production.

Some of our wealthy friends have said that we shall never have such prosperity as we have just seen. Perhaps they are right, but it is our opinion that just as soon as the average workman is assured of a steady job, he will make a down payment on some of the luxuries which will start us into a new era of prosperity. Every new invention which appeals to the human mind and every article which offers better satisfaction create desires on the part of the ultimate consumer, and you can depend on him to demand more and more luxuries. All the great new inventions have ushered in periods of prosperity, and to say that there will be no real period of prosperity in the next 20 years is the equivalent of saying that there will be no great inventions during that period.

As you have said in your article, bring the price down so the ultimate consumer can buy, or, raise his hopes of increased income, and he will do the buying that will bring back prosperity.

**W. F. ROCKWELL,**
**President,**
Pittsburgh Equitable Meter Co.

(*To be continued next week*)

# Continental Prices Firmer but Debt Plan Fails to Stimulate British Steel

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(*By Cable*)

LONDON, ENGLAND, June 29.

THE iron and steel market is still slow in responding to the general enthusiasm for the Hoover debt proposals.

Cleveland pig iron has been sold in small lots for early delivery and makers have reasserted that price reductions are impossible, although special low quotations have been made in Scotland.

Hematite producers are accepting low prices, probably below cost, but stocks have been reduced and current output is being absorbed.

Seasonal slackness in finished steel is increasing, and shipbuilding specifications are almost unobtainable. Export demand is negligible, but domestic structural engineering orders are keeping the mills operating at low rates. It is believed that substantial orders are being held back, until after the steel makers' meeting in July, when a revision of prices is expected.

The French attitude to the Hoover plan and German sales to the Soviet Union have imparted a firmer tone to the Continental steel market. Many works are not selling, and indications point to a further rise in prices. Meanwhile business is slow but inquiry is improving. British consumers of Continental steel are buying only for prompt delivery.

Tin plate production is increasing with closed mills resuming operation. Prices, however, are low as such mills

**Continental Steel Cartel considers fines of $10 to $15 a ton for overproduction.**

* * *

**South Africa places trial order for 5000 tons of rails with Japanese steel works.**

* * *

**German mills encounter financial obstacles in Soviet business, offering only 21 months credit, while Russians seek 30 months.**

* * *

**Japanese Government steel works lost $5,400,000 in fiscal year 1930 to 1931.**

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**Soviet may buy 250 used locomotives in Germany, and is negotiating for 100,000 tons of steel in Poland.**

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are seeking to book as much tonnage as possible.

General sales of tin plate are small, but inquiry is broadening, and when low priced sellers are sufficiently well booked, increased prices are expected, especially if the strength of the tin market is maintained. Works have accepted 13s. 3d. ($3.22) per base box, but the usual quotation is 3d. to 1s. (6c. to 24c.) higher.

Improved buying of galvanized sheets by South American, South African and West Indian markets is reported, but India is still quiet. Total business consequently is small and mills are still keen sellers. Sheet prices are unchanged, but the tendency is firmer based on the rising spelter market.

The engineering trade unions have accepted the employers' terms for a wage reduction, effective July 6.

Sheffield mills have received the first inquiries from China under the Boxer indemnity allocation. Included are 9000 tons of steel railroad ties.

The Templeborough Rolling Mills have offered to purchase William Cooke & Co., Tinsley.

The Continental Steel Cartel has a proposal to increase fines for overproduction to a range of $10 to $15 a ton, on re-establishment of the Cartel. Belgian mills, however, are still causing uncertainty of its renewal.

Representatives of European wire mills will meet in Paris June 30, to discuss re-establishment of a Continental Wire Syndicate.

South Africa has placed a trial order for 5000 tons of heavy rails with the Japanese Government Steel Works at £6 5s. ($30.38) per ton, c.i.f. Durban.

The Japanese steel works are suspending deliveries from scrap importers and domestic merchants for two months in an effort to diminish stocks.

Germany is experiencing financial

## British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at $4.8665 (par)

### British Prices, f.o.b. United Kingdom Ports

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Ferromanganese, export. | £9 | 0s. | | | | | $43.74 | |
| Billets, open-hearth..... | 5 | 0 | to | £5 | 7½s. | | 24.30 to | $26.12 |
| Black sheets, Japanese specifications ..... | 10 | 5 | | | | | 49.82 | |
| Tin plate, per base box.. | 0 | 13½ | to | 0 | 14¼ | | 3.25 to | 3.46 |
| | | | | | | | Cents a Lb. | |
| Steel bars, open-hearth.. | 7 | 17½ | to | 8 | 7½ | | 1.71 to | 1.81 |
| Beams, open-hearth..... | 7 | 7½ | to | 7 | 17½ | | 1.60 to | 1.71 |
| Channels, open-hearth... | 7 | 12½ | to | 8 | 2½ | | 1.66 to | 1.76 |
| Angles, open-hearth..... | 7 | 7½ | to | 7 | 17½ | | 1.60 to | 1.71 |
| Black sheets, No. 24 gage | 8 | 10 | | | | | 1.84 | |
| Galvanized sheets, No. 24 gage ..... | 9 | 15 | | | | | 2.11 | |

### Continental Prices, f.o.b. Antwerp or Hamburg

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos. ..... | £2 | 6s. | to | £2 | 7s. | $11.19 to | $11.42 |
| Billets, Thomas (nominal) | £3 | 3s. | to | £3 | 4s. | $15.31 to | $15.55 |
| Wire rods, low C., No. 5 B.W.G. ..... | 5 | 0 | to | 5 | 5½ | 24.30 to | 25.64 |
| Rails, light ..... | 6 | 0 | | | | 29.20 | |
| Black sheets, No. 31 gage, Japanese..... | 11 | 5 | to | 12 | 12 | 54.68 to | 58.32 |
| | | | | | | Cents a Lb. | |
| Steel bars, merchant.... | 3 | 8 | to | 3 | 10 | 0.74 to | 0.76 |
| Beams, Thomas, British standard (nominal) .. | 3 | 7½ | to | 3 | 8 | 0.73 to | 0.74 |
| Channels, Thomas, American sections..... | 5 | 12 | to | 5 | 14 | 1.24 to | 1.26 |
| Angles, Thomas, 4-in. and larger, over ⅜-in. thick ..... | 3 | 7 | to | 3 | 8 | 0.73 to | 0.74 |
| Angles, Thomas, 3-in.... | 3 | 9 | to | 3 | 10 | 0.75 to | 0.76 |
| Hoops and strip steel over 6-in. base..... | 4 | 0 | to | 4 | 2½ | 0.87 to | 0.89 |
| Wire, plain, No. 8 gage.. | 5 | 0 | | | | 1.09 | |
| Wire, barbed, 4-pt. No. 12 B.W.G..... | 8 | 15 | | | | 1.89 | |

obstacles in connection with Russian orders and certain mills have withdrawn. Germany is generally able to offer only 21 months credit while the Soviet requests 30 months.

German output in May was 744,000 tons of raw steel and 495,000 tons of rolled steel.

Saar output in May was 130,000 tons of pig iron, with 21 furnaces in blast at the end of the month, and 135,000 tons of raw steel.

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## Many German Companies Liquidating

HAMBURG, GERMANY, June 17.—Since 1926, bankruptcy and liquidation in Germany have brought a net reduction of 25,000 in the number of registered companies. Liquidation of companies has increased this year. In the first four months, the average monthly registration of new companies was 713, while 1687 companies a month were liquidated. This brought a net loss of 3900 companies in four months. It is noteworthy that of 50 companies dissolved in March only seven were in existence prior to the war.

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## Japanese Steel Works Lost $5,400,000

YOKOHAMA, JAPAN, June 1.—A statement of the Seitetsu-Jo (Government Steel Works) for the fiscal year 1930 to 1931, reports a net loss of 10,934,000 yen ($5,400,000) after depreciation, revaluation of raw materials in stock, payment of bond interest, pensions and other fixed charges. Production of steel for the fiscal year was about 720,000 tons, a decline in output of about 30 per cent from the previous fiscal year.

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## Soviet Iron Ore Arrives in Larger Volume

WASHINGTON, June 29.—Rising exports of iron ore from Soviet Russia have created considerable interest. The movement apparently indicates further spread of activities of that country in penetrating foreign markets in connection with its five-year plan. Large iron ore producing countries themselves are included in those being reached by the Soviet ore, which is reported to range from 50 to 55 per cent iron content.

Iron ore imports from Russia entering the United States in the first four months of 1931 aggregated 89,294 gross tons, with a total value at port of shipment of $183,443, or an average of $2.04 a gross ton. This compares with 486,844 tons, valued at $1,302,711, received in the same period from all other countries, the gross ton average price being $2.62. The varying content of ores from the different countries is not known so that a comparison, based on price per unit of iron is not possible.

The Russian ore is reported to come chiefly from the Donetz coal basin on the Dnieper River, in the southern part of the country. The highest grade iron ore in the Soviet, said to range to 60 per cent and over, is mined in the Ural region.

Iron ore imports from Russia into the United States began to be received in sizable quantities last June, which, coincidently, was when the Hawley-Smoot tariff act went into effect, while since that period imports of manganese ore from Russia have been comparatively small. The new tariff act continued iron ore free of duty and applied the duty of 1c. per lb., contained manganese, on ore of 10 per cent or more, against the previous duty of 1c. per lb. on ore containing 30 per cent or more of manganese.

Imports of iron ore from that country last year amounted to 63,412 tons of a total of 2,774,124 tons. Beginning last June, iron ore imports from Russia were 6771 tons. The next shipments were received in September and receipts have entered the United States each month since, reaching a peak last December, with 31,754 tons, closely approached last March with 30,184 tons. Of the 1931 Russian ore imports, totaling 89,294 tons, 80,244 tons was received at Baltimore, while the remaining 9050 tons arrived at Boston.

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## Japan Using More Aluminum Foil

YOKOHAMA, JAPAN, June 1.—Consumption of aluminum foil in Japan has been increasing recently and is now estimated at 30,000 to 35,000 lb. a month. While there are two makers in Japan at present, the Fukuda and Tokai Enken works, the Sumitomo Aluminum Co. is planning to start producing next month. Large production of aluminum foil here is hampered by the cost of light-gage aluminum sheets. Another obstacle is the competition from German and Swiss manufacturers of aluminum foil. The Japan Aluminum Foil Merchants' Association in Tokio has an average turnover of 15,000 to 16,000 lb. of aluminum foil a month, of which about 9000 lb. is of Japanese origin and the remainder imported. With the Sumitomo works in production, it is believed that the association's turnover will be almost entirely of domestic origin.

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Union Chain & Mfg. Co., Sandusky, Ohio, has appointed Industrial Gear & Machine Works, 225 Sixth Avenue, Oakland, Cal., as exclusive distributer in that territory.

## Germans Expect Steel Orders from British

HAMBURG, GERMANY, June 17.—Continental steel mills are awaiting substantial orders from British shipbuilders, following refusal of British mills to grant drastic reductions on shipbuilding material. At a recent meeting in Carlisle, England, of the Shipbuilding Employers' Association, it was said that large contracts would be placed with Continental makers, as the difference in price between British and Continental shipbuilding steel is about £2 ($9.72) a ton, despite the rebate granted by the British mills to shipyards using British steel exclusively. The shipbuilders consider purchase of Continental steel essential to meet competition of foreign shipyards.

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## Soviet Buys More Steel in Germany and Poland

HAMBURG GERMANY, June 17.—A steel order just placed by the Soviet Union with German mills calls for 80,000 tons of bars and shapes, 80,000 tons of plates, sheets and hoops and 40,000 tons of semi-finished material and rails, for delivery in the next two months. The average price of these products was £4 19s. ($24.09) a ton. Negotiations have been instituted by Russia with the German Railways Administration for purchase of 200 to 250 used steam locomotives. If the contract is closed, the German railroads will buy 80 to 90 new locomotives from German builders. As Polish steel mills have recently volunteered to consider granting the credit concessions sought by the Soviet on steel orders, negotiations for purchase of an additional 100,000 tons of products have been renewed.

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## Germany's May Exports Show Increase

WASHINGTTON, June 30.—German exports of iron and steel products increased in May to 314,625 tons, compared with 292,042 tons in April, and imports decreased to 81,143 tons in May from 89,933 tons in April. The largest item in Germany's May steel exports was 73,811 tons of bars, rods and angles. Tin plate, export of which German mills have been seeking to develop in recent months, totaled 8233 tons in May, compared with 3345 tons in April.

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Division of Simplified Practice, Department of Commerce, has announced that a general conference of all interests held in New York, on June 18, approved a simplified practice recommendation on wire screen cloth and appointment of a standing committee.

# NEW TRADE PUBLICATIONS

**Arc Welding Data.**—Westinghouse Electric & Mfg. Co., East Pittsburgh. Bulletin 15 provides complete data on arc welding for various applications. Included are inspections and tests, with special attention given to welding by means of the company's flex-arc equipment.

**Coal Burners.**—Fuller Lehigh Co., 85 Liberty Street, New York. Bulletin 905 deals with a circular burner of the turbulent type, designed for use in pulverized coal through solid refractory walls with a minimum of alterations. Bulletin describes the application, construction and operation of these burners.

**Metal Grilles.**—Diamond Mfg. Co., Wyoming, Pa. A folder illustrating and describing perforated metal grilles of steel, brass, bronze, copper, aluminum, nickel, silver and other metals. Illustrations include drawings of 12 different designs, with the percentage of open area in each indicated.

**Saws.**—Henry Disston & Sons, Inc., Tacony, Philadelphia. A 48-page booklet with 229 illustrations, entitled "Disston Saw, Tool and File Manual," intended to instruct the tool user in the selection, care and use of tools made by the company, such as saws of all kinds, squares, bevels, woodworking gages and files. Included is a history of the saw industry, pointing out that the first Disston hand saw was made 91 years ago.

**Compressed Gases.**—National Safety Council, 20 North Wacker Drive, Chicago. An eight-page bulletin outlining safe practices in handling compressed gases. Drawings show the proper method of handling cylinders, and photographs show proper storage facilities. A table of 16 gases used industrially shows the physical state of the gas as shipped, the effect when breathed, whether or not it is inflammable and its inflammable range with air.

**Storage Bins.**—Stackbin Corpn., Pearl and Rice Streets, Providence, R. I. Two bulletins illustrating and quoting measurements and prices on the company's nesting bins for stock, tool or assembling rooms.

**Enamel.**—Porcelain Enamel Institute, 612 North Michigan Avenue, Chicago. A 24-page booklet entitled, "What You Should Know About Porcelain Enamel." It is written primarily for salesmen interested in porcelain enamel as a finish for such products as washing machines, refrigerators, stoves and ranges, kitchenware, reflectors, tile, scales and signs.

**Hydraulic Metal-Cutting Machines.**—Racine Tool & Machine Co., Racine, Wis. Catalog No. 59 illustrates the complete line, including three new hydraulically controlled reciprocating-type power hack saws designed to handle 10x10, 12x12 and 10x-16-in. stock.

**Roller Chain Drives.** — Baldwin-Duckworth Chain Corpn., Worcester Mass. Bulletin No. 41, 12 pages, giving dimensions and prices of stock sprockets with integral hubs for all pitches of chain from ⅜ to 2 in. inclusive. Tables of speed ratios and standard chain prices for stock drives are included.

**Centrifugal Pumps.**—De Laval Steam Turbine Co., Trenton, N. J. Folder illustrates development of Rose Station, Pittsburgh, since 1913, when a geared turbine-driven water works centrifugal pump, said to be the first large unit of its type in the country, was installed.

**Die Set Chart.**—Danly Machine Specialties, Inc., Chicago. Wall chart, 11 x 17 in., presenting convenient data pertaining to 20 sizes and six thickness combinations of the most frequently used types of die sets for square, rectangular and round dies.

**V-Belt Drives.**—L. H. Gilmer Co., Tacony, Philadelphia. An 84-page catalog in two sections, the first devoted to the theory and practice of multiple V-belt operation. The second section contains engineering formulas for all V-belt calculations, detailed tables, a large chart of center distances and belt lengths, and other data.

**Clutches.**—Carlyle Johnson Machine Co., Manchester, Conn. Booklet outlining the improved features of the new "Super-Johnson" clutch, in which the expanding friction ring is faced on its outside diameter with a special heat-resisting material.

**Electric Welding.** — Thomson-Gibb Electric Welding Co., Bay City, Mich. Leaflet illustrates electric welding of pipe end to end.

**Concrete Conveyors.**—Barber-Greene Co., Aurora, Ill. An interesting booklet, 44 pages, giving photographic evidence of the varied uses of conveyors in construction work and describing the handling of concrete in a number of large construction projects.

**Centrifugal Pumps.**—DeLaval Steam Turbine Co., Trenton, N. J. Centrifugal pumps for handling liquids carrying solids are interestingly illustrated and described in a 16-page booklet, giving speed, head and capacity table and dimensions of clogless pumps.

**Couplings.**—Morse Chain Co., Ithaca, N. Y. Bulletin No. 40 is descriptive of a new midget flexible coupling. Illustrated and carries a clearance table for five sizes.

**Power Lift Trucks.**—Crescent Truck Co., Lebanon, Pa. Illustrated folder pictures various uses of power lift trucks in industry.

**Gantry Cranes.**—Cleveland Electric Tramrail, division of Cleveland Crane & Engineering Co., Wickliffe, Ohio. Tramrail gantry cranes are pictured in an illustrated folder, as aids to the heavy, overhead traveling cranes.

**Electric Resistors.**—Ryan, Scully & Co., Philadelphia. An illustrated eight-page pamphlet, entitled "R-S Electric Furnace Metallic Resistors" and issued as Bulletin 1206, describes this company's patented design for heating operations. These resistors are claimed to effect uniformity of heat dissipation with low upkeep cost.

**Oil Burners.**—Ryan, Scully & Co., Philadelphia. Bulletin No. 2 of eight pages, illustrated, describes low pressure oil burners with auxiliaries produced by this company. Three types are included, one for general combustion conditions, one for special minimum capacities and one for heavy oil and preheated air.

**Mercury Arc-Rectifier.** — Westinghouse Electric & Mfg. Co., East Pittsburgh. Circular 1907, describing steel tank rectifier arc for conversion of alternating current to direct current for use in supplying power for electric traction systems and certain industrial applications. Photographs and drawings are included.

**Positive Drives.**—Link Belt Co., 910 South Michigan Avenue, Chicago. Book 1293, illustrating complete line of positive drives: silent chain, roller chain, herringbone gears, herringbone speed reducers, worm-gear speed reducers, steel and malleable chains and P. I. V. gear.

**Automatic and Remote-Control Cars.**—Atlas Car & Mfg. Co., Cleveland. Comprehensive, illustrated booklet, 11 pages, explaining how automatic and remote-control systems permit use of cars of any type and capacity. While most installations of automatic car equipment involve use of relatively small-capacity cars, it is said to be possible to apply the idea to much larger cars.

**Gas Burners.**—Lee B. Mettler Co., 406 South Main Street, Los Angeles. Illustrated folder briefly discusses the Mettler gas burner in connection with the entrained combustion method.

**Pressure Control Equipment.**—Brooke Engineering Co., 3640 North Lawrence Street, Philadelphia. A booklet showing by means of charts from service operations how pressure or temperature is being regulated under widely varying conditions.

**Abrasives.**—Norton Co., Worcester, Mass. Booklet deals with the application of alundum abrasive for sandblasting granite.

**Conveyors.** — Fairfield Engineering Co., Marion, Ohio. Folder pictures a number of uses of portable belt conveyors.

**Electrical Equipment.**—Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2218, 48 pages, with index and price lists, covering threadless condulets, couplings and connectors for rigid conduit and electrical metallic tubing.

**Brushes.**—National Carbon Co., Inc., Cleveland. Booklet of two sections, the first devoted to descriptions, dimensions, etc., of carbon, graphite and metal-graphite brushes; the second covering complete list of prices.

**Steel Reinforcing.** — A. O. Smith Corpn., Milwaukee, Wis. Folder describes "Smithsteel Coat of Mail" for armoring concrete and mastic floors, driveways, etc., where heavy shock and wear are encountered.

**Reversing Motors.**—Reliance Electric & Engineering Co., Cleveland. A well-prepared booklet, illustrated, covering the advantages of using reversing planer motors on planers of all makes. Table of ratings, horsepower requirements for planers, and general outline dimensions of sleeve-bearing motors are given.

# STEEL EXPORTS AND IMPORTS ARE STILL DECLINING

WASHINGTON, June 26.—Declining 9674 gross tons, exports of iron and steel in May totaled 91,407 tons, against 101,081 tons in April. They were the lowest since the short month of February, at 91,212 tons. The February movement was the lightest since August, 1921, when outgoing shipments were 75,827 tons.

Imports in May of the current year also showed a decline under April, dropping 10,696 tons to 37,176 tons, a decline of 22 per cent.

In the first five months of 1931 exports aggregated only 485,957 tons, a decrease of 567,392 tons, or 53.4 per cent, from the corresponding period of last year. Imports in the first five months amounted to 194,275 tons, a drop of 57,294 tons, or 22.8 per cent, from the first five months of 1930.

Exports to Canada in May were 42,970 tons, or slightly more than 47 per cent of the total outgoing shipments. In the first five months exports to Canada were 238,583 tons, or approximately 49 per cent of total exports for that period. Included in the tonnages taken by Canada in May were: Steel rails 1538 tons; black steel sheets, 2693 tons; steel plates, 4599 tons; plain heavy structural material, 6607 tons; tin plate, 1639 tons; and steel bars, 1624 tons.

Japan was the second largest market for American exports in May, taking 6877 tons, closely approached by the Philippine Islands, with 6387 tons.

Belgium was the largest source of imports in May, supplying 10,896 tons, with British India second, furnishing 9252 tons.

Soviet Russia was the leading source of both manganese ore and iron ore imports in May, supplying 12,913 tons and 76,291 tons, respectively. This is the first time in many months that Chile has not led in iron ore shipped in. Canada furnished 4914 tons of the 21,304 tons of manganese ore imported while 2339 tons came from the Gold Coast of Africa and 1300 tons came from India.

Of the 1708 tons of ferromanganese imported in May, Canada supplied 1220 tons and the United Kingdom 424 tons. Belgium was the source of 2342 tons of the 3554 tons of reinforcing bars imported.

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**Exports of Iron and Steel from the United States**

(In Gross Tons)

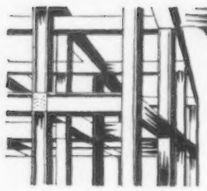
| | May | | Five Months Ended May | |
|---|---|---|---|---|
| | 1931 | 1930 | 1931 | 1930 |
| Pig iron | 812 | 1,063 | 2,447 | 8,162 |
| Ferromanganese | 1 | 1,004 | 15 | 3,955 |
| Scrap | 13,231 | 41,567 | 65,883 | 245,952 |
| *Pig iron, ferroalloys and scrap* | *14,044* | *43,634* | *68,345* | *258,069* |
| Ingots, blooms, billets, sheet bar | 240 | 1,788 | 2,023 | 12,555 |
| Skelp | 5,752 | 15,695 | 29,574 | 47,929 |
| Wire rods | 4,532 | 4,535 | 17,976 | 21,372 |
| *Semi-finished steel* | *10,524* | *22,018* | *49,573* | *81,856* |
| Steel bars | 3,282 | 7,893 | 22,115 | 49,035 |
| Alloy steel bars | 317 | 941 | 2,262 | 4,305 |
| Iron bars | 104 | 188 | 443 | 769 |
| Plates, iron and steel | 5,338 | 8,668 | 24,370 | 55,359 |
| Sheets, galvanized steel | 6,053 | 8,013 | 22,548 | 45,359 |
| Sheets, galvanized iron | 426 | 865 | 2,913 | 3,039 |
| Sheets, black steel | 5,082 | 9,921 | 39,097 | 60,909 |
| Sheets, black iron | 743 | 895 | 3,446 | 5,144 |
| Hoops, bands, strip steel | 3,066 | 4,611 | 17,237 | 23,214 |
| Tin plate; terne plate | 6,129 | 14,719 | 37,981 | 106,923 |
| Structural shapes, plain material | 7,548 | 10,123 | 45,902 | 68,937 |
| Structural material, fabricated | 3,518 | 9,332 | 20,942 | 48,637 |
| Tanks, steel | 688 | 973 | 7,922 | 7,070 |
| Steel rails | 3,190 | 11,926 | 17,428 | 46,809 |
| Rail fastenings, switches, frogs, etc. | 574 | 1,916 | 3,311 | 8,696 |
| Boiler tubes | 581 | 1,228 | 3,772 | 8,395 |
| Casing and oil-line pipe | 4,161 | 7,880 | 14,499 | 38,472 |
| Pipe, black and galvanized, welded steel | 4,055 | 8,175 | 19,866 | 39,957 |
| Pipe, black and galvanized, welded iron | 554 | 1,573 | 2,404 | 8,657 |
| Plain wire | 1,181 | 2,664 | 6,434 | 13,703 |
| Barbed wire and woven wire fencing | 3,028 | 4,462 | 12,776 | 17,861 |
| Wire cloth and screening | 86 | 152 | 767 | 704 |
| Wire rope | 254 | 527 | 1,329 | 2,270 |
| Wire nails | 585 | 623 | 3,604 | 3,191 |
| Other nails and tacks | 323 | 672 | 1,741 | 2,905 |
| Horseshoes | 22 | 12 | 33 | 61 |
| Bolts, nuts, rivets and washers, except track | 495 | 987 | 2,529 | 5,239 |
| *Rolled and finished steel* | *61,383* | *119,939* | *337,671* | *675,620* |
| Cast iron pipe and fittings | 2,320 | 2,845 | 12,369 | 15,746 |
| Malleable iron screwed fittings | 468 | 1,115 | 2,712 | 5,560 |
| Car wheels and axles | 620 | 2,494 | 3,451 | 7,130 |
| Iron castings | 308 | 768 | 2,309 | 3,540 |
| Steel castings | 260 | 738 | 2,050 | 5,202 |
| Forgings | 889 | 795 | 4,087 | 4,309 |
| *Castings and forgings* | *4,865* | *8,755* | *26,978* | *41,487* |
| All other | 591 | 1,079 | 3,390 | 6,317 |
| Total | 91,407 | 195,425 | 485,957 | 1,063,349 |

**Imports of Iron and Steel Products into the United States**

(In Gross Tons)

| | May | | Five Months Ended May | |
|---|---|---|---|---|
| | 1931 | 1930 | 1931 | 1930 |
| Pig iron | 10,057 | 14,641 | 46,490 | 56,301 |
| Sponge iron | .... | | 209 | |
| Ferromanganese and spiegeleisen* | 1,708 | 4,781 | 12,263 | 28,275 |
| Ferrochrome† | 15 | .... | 71 | 87 |
| Ferrosilicon‡ | 65 | 742 | 515 | 3,150 |
| Other ferroalloys | .... | .... | 610 | .... |
| Scrap | 1,497 | 1,749 | 6,307 | 11,779 |
| *Pig iron, ferroalloys and scrap* | *13,342* | *21,913* | *66,465* | *99,592* |
| Steel ingots, blooms, billets, etc | 1,582 | 1,117 | 10,005 | 7,468 |
| Wire rods | 669 | 490 | 3,401 | 4,923 |
| *Semi-finished steel* | *2,251* | *1,607* | *13,406* | *12,391* |
| Concrete reinforcement bars | 3,554 | 3,101 | 18,479 | 16,432 |
| Hollow bar and drill steel | 149 | | 623 | |
| Merchant steel bars | 2,371 | | 19,777 | |
| Iron bars | 33 | 62 | 337 | 686 |
| Iron slabs | 19 | | 40 | |
| Boiler and other plate | 3 | .... | 627 | 1,329 |
| Sheets, skelp and saw plate | 2,296 | 1,558 | 9,453 | 12,441 |
| Tin plate | 4 | 11 | 52 | 57 |
| Structural shapes | 6,221 | 19,640 | 30,817 | 74,196 |
| Sheet piling | 123 | | 579 | |
| Rails and rail fastenings | 214 | 467 | 3,620 | 2,313 |
| Welded pipe | 809 | 419 | 2,872 | 2,168 |
| Other pipe | 343 | 1,168 | 4,878 | 7,337 |
| Barbed wire | 606 | 283 | 2,639 | 2,110 |
| Round iron and steel wire | 258 | 829 | 1,281 | 2,523 |
| Flat wire and strip steel | 48 | 110 | 282 | 665 |
| Wire rope and strand | 160 | 248 | 861 | 1,236 |
| Other wire | 16 | 5 | 308 | 164 |
| Hoops and bands | 1,390 | 2,098 | 7,959 | 8,652 |
| Nails, tacks and staples | 750 | 229 | 3,143 | 1,864 |
| Bolts, nuts and rivets | 72 | 59 | 518 | 214 |
| Other finished steel | 180 | 2 | 202 | 3 |
| *Rolled and finished steel* | *19,619* | *30,289* | *109,347* | *134,390* |
| Cast iron pipe and fittings | 1,696 | 342 | 4,173 | 4,354 |
| Castings and forgings | 268 | 164 | 884 | 842 |
| Total | 37,176 | 54,315 | 194,275 | 251,569 |
| Manganese ore* | 21,304 | 26,700 | 82,957 | 117,424 |
| Iron ore | 194,397 | 291,372 | 770,536 | 1,401,756 |
| Magnesite (dead burned) | 496 | 81 | 8,632 | 12,870 |

*Manganese content only.
†Chromium content only.
‡Silicon content only.



# PLANT EXPANSION AND EQUIPMENT BUYING

## General Motors Places Large Order

### Pratt & Whitney Co., Recipient of Award, Will Operate at Present Rate All Summer

WHILE the machine tool industry has shared with business interests generally the improvement in sentiment that has accompanied President Hoover's efforts to bring about a year's recession of payments of war debts and reparations, there has been little noticeable effect thus far on orders or inquiries.

A large order for grinding equipment has been placed by the General Motors Corpn. with the Pratt & Whitney Co., Hartford, Conn., but it is probable that negotiations were started some time before the favorable turn of events last week. The amount of the General Motors order has not been announced, but it is sufficient to maintain the present rate of employment at the Pratt & Whitney shops throughout the summer.

The Brooklyn Navy Yard is expected to place orders this week for 16 lathes and a few other machines.

In general, however, the machine tool markets are dull almost to the point of stagnation. A great deal of prospective business is overhanging the market, and action upon some of this may be expected when general business has taken a more forward stride. Many prospective buyers have assembled machine tool prices and cost data, and are simply awaiting the word from boards of directors or other executive branches of their companies to go ahead. The trade is not hopeful, however, that much of this business will be released before late August or early September, and even this anticipation is predicated on the possibility of more favorable developments.

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### NEW YORK

A prospective award of 16 lathes and a few other machines this week by the Brooklyn Navy Yard is the outstanding development in a dull machine tool market. While sentiment among both buyers and sellers is much better as a result of the move for an international suspension of war debts and reparations for a year, none of the orders or inquiries of the week can be directly traceable to this change of sentiment. Inquiries for one or two machines are reported, however, from companies that have not bought machine tool equipment in some time.

### MILWAUKEE

The machine tool market is less active, both as to inquiries and sales. Some machine shops, including a number of important ones, have reduced operations almost to the point of closing for a week or two in the hope that accumulated orders during that time will enable them to resume on a more definite schedule. Meanwhile, equipment is being given close scrutiny to determine the necessity and scope of replacements. This may result in some immediate improvement in machine tool business. July payrolls probably will go to the low point of the year because of vacations and the possible recurrence of extremely hot weather, which has struck with great force in the past two to three weeks.

### CINCINNATI

Sluggishness continues in the machine tool market. A small number of orders were received last week, but not in sufficient volume upon which to base forecasts of improvement in the immediate future. A slight increase in inquiries was noted, but these are expected to result only in giving information upon which buyers will act when funds are available.

### CLEVELAND

Demand for machine tools continues light, with no indications of early improvement. Orders are limited to single tools and not many of these are moving. The volume of business in June was somewhat below that in May. A moderate amount of replacement business is in prospect as soon as general business improves.

### CHICAGO

The slight change upward in inquiries noted a week ago has not carried through and the local machine tool market is about as dull as at any time this year. Numerous shops will be closed during part or all of July as a move toward readjustment and also for vacations. The Central West has been in the throes of a severe heat wave which normally tends to retard buyers' activities. Users of machine tools are shopping closely, which accounts for the proportionate better activity in used than in new equipment. Supplies of old machines are more than ample to meet current requirements.

### NEW ENGLAND

General Motors Corpn. has placed a substantial order for grinding equipment with the Pratt & Whitney Co., which will necessitate a night and day shift until September. Other details are not available. New England machine tool builders did little the past week, and dealers report no improvement, although some used tool dealers are selling a number of bench millers, lathes and hacksaws.

Small tool sales are holding up well.

### PITTSBURGH

Local sellers do not look for any change in the machine tool situation during July. The majority expects a general improvement beginning in August, but present inquiry would scarcely justify even this change. None of the large buyers in the district are in the market and current orders are confined to single tools and spare parts.

Builders of heavy machinery and equipment are still busy, but no new orders have been reported since the Otis Steel Co., Cleveland, placed its continuous strip mill. Youngstown Sheet & Tube Co. has taken no action on the continuous sheet mill it was expected to buy earlier in the year.